APPENDIX I

SUMMARIES OF RESPONSES TO THE LOGGERHEAD SHRIKE STATUS ASSESSMENT QUESTIONNAIRE IN THE UNITED STATES (ARRANGED BY U.S. FISH AND WILDLIFE SERVICE REGIONS) AND CANADA

North American Breeding Bird Survey (BBS) trends reported are average % change/year
P: measure of statistical significance of the trend (actual P values reported)
N: number of routes used in calculating the trend

Christmas Bird Count (CBC) trends reported are average % change/year
Significance (corresponding P values): * :P < 0.10, ** :P < 0.05, *** :P < 0.01
"NO" indicates CBC trend is not statistically significant
N: number of circles (counts) used in calculating the trend

U.S. FISH AND WILDLIFE SERVICE REGION 1

California, Idaho, Nevada, Oregon, Washington

CALIFORNIA

Historic and Current Range of the Loggerhead Shrike

Grinell and Miller (1944) mapped distribution of loggerhead shrike in California as statewide, except at some high elevations. A comparison with a range map produced by the California Department of Fish and Game in 1989 indicates little change in the distribution of the species. The species is resident year-round, except for northern California where some of the breeding population is migratory (Grinell and Miller 1944).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -2.0 P=0.06 N=106
BBS Trend 1966-1979: -6.5 P=0.01 N= 79
BBS Trend 1980-1998: -0.7 P=0.50 N= 92

BBS sample sizes are adequate to estimate statewide trends.

Other than BBS data, no trend information is available for breeding population.

CBC Trend 1959-1988: -1.3 Significance ** N=130

State Legal Status

California Bird Species of Special Concern, an administrative designation assigned to those species which are experiencing, or have experienced, a population decline or range contraction. The California Department of Fish and Game is in the process of revising this list, and preliminary review suggests loggerhead shrike may no longer warrant special concern status in the state (John Carlson, Jr., California Department of Fish and Game, pers. comm.).

Current Research and Monitoring

The California Department of Fish and Game has issued 6 Scientific Collecting Permits for individuals conducting research on the species since 1992; however, the nature of the research was not noted (J. Carlson, Jr., pers. comm.).

Some information is gathered through the Monitoring Avian Productivity and Survivorship program, but loggerhead shrike is not a targeted species and most of the program's sampling stations are located outside of grassland or open shrubland habitats.

Considerable research has been conducted on the Federally-endangered subspecies *L.l. mearnsi* (San Clemente Island loggerhead shrike), which occurs on San Clemente Island, California.

J. Carlson, Jr. (pers. comm.) noted that a status assessment has been conducted on *L.l. anthony*i (citation

not provided).

Threats to the Loggerhead Shrike in the State

J. Carlson, Jr. (pers. comm.) noted: "The lack of research activities in California, coupled with the perception of abundance in the birding community, have led to a lack of research and management focus on this species. Consequently, with the exception of habitat loss, the relative importance of threat factors is unknown."

Habitat Requirements and Condition

The California Department of Fish and Game maintains the California Wildlife Habitat Relationship System, a computerized database of predictive habitat models for terrestrial vertebrates, including loggerhead shrike. Habitat types rated as having medium to high value for breeding loggerhead shrikes include: Blue Oak Woodland, Coastal Oak Woodland, Desert Riparian, Joshua Tree, Juniper, Pinyon-Juniper, and Valley Oak Woodland. J. Carlson, Jr. (pers. comm.) further noted that loggerhead shrikes use a variety of open to sparsely-vegetated habitats, including urban and commercial areas. For example, shrikes have been observed nesting in ornamental trees associated with business parks provided that adjacent open grasslands are available.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), 3 continental and 2 island subspecies occur in California. *L.l. gambeli* (California loggerhead shrike) inhabits the northeastern plateaus, central valley, and southern and central coastal plains. *L.l. nevadensis* (Nevada loggerhead shrike) inhabits the Mojave Desert Region. *L.l. sonoriensis* (Sonora loggerhead shrike) occupies the southeast Sonoran Desert Region. *L.l. mearnsi* (San Clemente Island loggerhead shrike) and *L.l. anthonyi* (Island loggerhead shrike) are found on islands off the coast of Southern California.

Subspecific taxonomic designations by Miller (1931) were based on morphometrics. J. Carlson, Jr. (pers. comm. *citing* Mundy and Woodruff in press) noted that DNA analysis supported the treatment of *L.l. mearnsi* as a separate taxon. However, he further noted that some ornithologists have demonstrated a loss of the morphometric characteristics originally separating *L.l. mearnsi* from *L.l. anthonyi*, presumably the result of interbreeding between these subspecies.

Loggerhead Shrike Conservation Activities in the State

No large scale activities are known, but designation with State Special Concern status since 1992 may have resulted in more consideration of shrike habitat (J. Carlson, Jr., pers. comm.).

IDAHO

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike breeds throughout the Snake River Plain of southern Idaho in suitable habitat (Groves et al. 1997). Historic range was probably coextensive with the distribution of big sage shrub-steppe habitat, the preferred habitat in Idaho (Tom Cade, Peregrine Fund, pers. comm.). Woods (1995a) observed that loggerhead shrikes breeding in southern Idaho may be confined to areas below 1,675 m, and usually below 1,525 m. Most Idaho loggerhead shrikes migrate south in fall, but a few overwinter in

woody, protected valleys (T. Cade, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: - 8.8 P=0.22 N=14
BBS Trend 1966-1979: trend not available
BBS Trend 1980-1998: -14.8 P=0.08 N=14

BBS sample sizes are adequate to estimate statewide trends.

Idaho Department of Fish and Game (1992) noted that of 119 migratory landbirds found in Idaho, that BBS trends indicated significant declines for 7, including the loggerhead shrike.

Other than BBS data, there are no statewide data available to estimate population trends. Woods (1995a) estimated population densities for 2 study areas in southern Idaho.

State Legal Status

Species of Special Concern (Charles Harris, Idaho Fish and Game Department, pers. comm.).

Current Research and Monitoring

No known research since work conducted by Woods (1995a) in 1991-1992.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Destruction of shrub-steppe habitat has contributed to declines in loggerhead shrike populations in Idaho (Woods 1995a; C. Harris and T. Cade, pers. comms.). Idaho's sagebrush habitats have been altered by increased frequency of wildfire and subsequent invasion by exotic plants, which displace native bunchgrasses and shrubs (C. Harris, pers. comm.). In 1992, it was reported that nearly 2 million acres, approximately 20% of Idaho's shrub-steppe rangelands, had burned in the previous decade (Idaho Department of Fish and Game 1992). Conversion of shrub-steppe habitats for grazing, agriculture, and development has also resulted in the loss of habitat for loggerhead shrikes (Woods 1995a; C. Harris and T. Cade, pers. comms.). Woods (1995a) estimated that over 65% of the big sagebrush habitat historically covering the Snake River Plain has been lost.

No other threats were noted.

Habitat Requirements and Condition

In Idaho, loggerhead shrikes are primarily associated with sagebrush habitats in the Snake River Plain. Most shrike habitat occurs on public land, much of it on Bureau of Land Management (BLM) lands.

Woods and Cade (1996) evaluated nesting habits of the loggerhead shrike in southwest Idaho's sagebrush rangelands. Overall, they described loggerhead shrike as being somewhat general in selection of nest sites, and suggested that variables other than nest sites, such as foraging perches, may be more important in defining suitable habitat in sagebrush-scrub habitat.

High densities of loggerhead shrikes documented by Woods (1995a) in relatively undisturbed shrub-

steppe habitats in Idaho point to importance of protection of remaining high quality shrub-steppe areas. Woods and Cade (1996) concluded that the preservation of Idaho's sagebrush rangelands will be important to the long-term survival of the loggerhead shrike in the state. Saab and Rich (1997) also considered protection of shrub-steppe habitats as critical for conservation of migratory land birds in the interior Columbia River Basin.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in Idaho are *L.l. gambeli*, possibly with intergradation with *L.l. nevadensis* along the southern boundary. C. Harris (pers. comm. *citing* Burleigh 1972) noted that specimens typical of *L.l. excubitorides* have been collected in northern Idaho.

Loggerhead Shrike Conservation Activities in the State

C. Harris (pers. comm.) noted that implementation of the sage grouse conservation strategy is likely to benefit loggerhead shrike. Idaho Partners in Flight (PIF) is developing a shrub-steppe habitat conservation plan. Bird species associated with shrub-steppe habitats in Idaho, including loggerhead shrike, Brewer's sparrow, and vesper sparrow, are experiencing population declines in the state (Idaho Department of Fish and Game 1992).

NEVADA

Historic and Current Range of the Loggerhead Shrike

Loggerhead shrike occurs statewide in Nevada; northern populations are migratory (Gary Herron, Nevada Division of Wildlife, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: - 7.9 P=0.00 N=32
BBS Trend 1966-1979: -11.9 P=0.03 N=17
BBS Trend 1980-1998: - 1.9 P=0.57 N=20

BBS sample sizes are adequate to estimate statewide trends. However, G. Herron (pers. comm.) noted that BBS data may not accurately reflect the status of the species in the state. Numerous areas with relatively high population densities are not represented by existing BBS routes. Additional routes are being established in northern Nevada.

State Legal Status

Loggerhead shrike is listed as "Protected" under State law; this confers protection from take of adults, young, or eggs. However, this designation provides no protection of nesting habitat, nor does it require any special consultation with regard to land use (G. Herron, pers. comm.).

Current Research and Monitoring

G. Herron (pers. comm.) noted that automobile survey routes were established in northern Nevada from 1993 through 1995, but have not been resurveyed since they were established. Based on these surveys, it was noted that northeastern Nevada supported a "healthy" population of loggerhead shrikes, although the

species was sparsely distributed.

The 1999 field season was the third year for the Nevada Breeding Bird Atlas (BBA), which will provide additional information on loggerhead shrikes in the state.

Threats to the Loggerhead Shrike in the State

Other natural or manmade factors affecting its continued existence: G. Herron (pers. comm.) noted: "Large acreages of Nevada are periodically sprayed with pesticides to control grasshoppers and crickets. It is suspected that these large scale pesticide applications are affecting shrikes and numerous other birds that feed heavily on these insects when they are available."

No other threats were noted.

Habitat Requirements and Condition

Shrikes occur in shrubland habitats in valley bottoms and alluvial fans up to mountain range fault lines; these habitats occur primarily on public lands. Habitat condition is highly variable due to differences in land use and grazing management (G. Herron, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in Nevada are *L.l. nevadensis*, with a zone of integration with *L.l. gambeli* at the northern edge of the state. G. Herron (pers. comm. *citing* Linsdale 1951) noted that *L.l. sonoriensis* has also been documented in the state.

Loggerhead Shrike Conservation Activities in the State

The loggerhead shrike is under consideration as a Species of Concern under the Nevada PIF program; this designation would result in additional management consideration for the species in the state (G. Herron, pers. comm.).

OREGON

Historic and Current Range of the Loggerhead Shrike

Marshall et al. (1996): "The loggerhead shrike occurs in lowland steppe habitats east of the Cascade Range in Oregon; rare west of the Cascade Range but recorded annually. Uncommon in winter; most Oregon birds suspected to winter in California and Mexico."

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -3.4 P=0.02 N=21
BBS Trend 1966-1979: 0.2 P=0.93 N= 9
BBS Trend 1980-1998: -1.8 P=0.44 N=18

BBS state trends are typically estimated for species observed on a minimum of 14 routes. Note that the trend for Oregon for the 1966-1979 period is based on an inadequate sample.

BBS data indicate a decline in Oregon since initiation of the survey. However, in shrub-steppe habitats of southeastern Oregon, no decline is evident since roadside counts were initiated in 1975; these counts indicate a fluctuating population (Marshall et al. 1996). Unpublished data suggest variability may be related to weather, specifically rainfall (Marshall et al. 1996).

CBC Trend 1959-1988: 1.5 Significance: NO N=27

State Legal Status

Special Concern (Marshall et al. 1996).

Current Research and Monitoring

Marshall et al. (1996) discussed roadside counts in Oregon which included loggerhead shrike, but we are not aware of any report on these counts.

Threats to the Loggerhead Shrike in the State

No specific information was provided, although loss and degredation of shrub-steppe habitats in the interior Columbia River Basin has been documented (Saab and Rich 1997).

Habitat Requirements and Condition

Loggerhead shrike in eastern Oregon is found mainly in sagebrush and juniper-steppe (Marshall et al. 1996). Csuti et al. (1997) noted that loggerhead shrikes occur in most open vegetation types provided that occasional tall shrubs or trees are present, including very open pine or oak woodlands.

Marshall et al. (1996) wrote: "The apparent stabilization of populations in southeast Oregon may reflect the relatively small proportion of shrub-steppe habitat that has been converted to cropland there as compared to eastern Washington and other areas."

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), loggerhead shrikes breeding in Oregon would be assigned to *L.l. gambeli*, with a zone of intergration with *L.l. nevadensis* in the southeast corner of the state.

Loggerhead Shrike Conservation Activities in the State

None

WASHINGTON

Historic and Current Range of the Loggerhead Shrike

Eastern Washington is the northwestern edge of the range of the loggerhead shrike. The species breeds east of the Cascade Mountains, but is rare west of that mountain range. Smith et al. (1997) noted that the species was more widespread in eastern Washington prior to massive conversion of shrub-steppe habitats to agriculture.

Loggerhead shrikes were present year-round at Poole's (1992) southcentral Washington study area (Hanford Site, U.S. Department of Energy), but were less abundant in winter. It appeared that the breeding population was migratory, and that the loggerhead shrikes present in winter were migrants from elsewhere.

Smith et al. (1997) described the species as a common nester in protected shrub-steppe habitats at the Hanford Site and Yakima Training Center.

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 270 birds on 19 BBS routes in Washington. Data are inadequate to estimate state trends.

Saab and Rich (1997) reported a 2.7% annual decline ($P<0.05$) between 1968-1994 based on BBS data for the interior Columbia River Basin.

Project Shrike (1993-94) developed baseline data on loggerhead shrike breeding density in shrub-steppe habitat of eastern Washington (McConnaughey and Dobler 1994). A repeated survey of this nature will be required to document shrike population levels and trends in eastern Washington (Matthew Vander Haegen, Washington Department of Fish and Wildlife, pers. comm.).

CBC Trend 1959-1988: -4.2 Significance ** N=14

State Legal Status

State Candidate (Washington Department of Fish and Wildlife 2000).

Current Research and Monitoring

Project Shrike was initiated by the Washington Department of Fish and Wildlife in 1993 to: 1) develop survey techniques for loggerhead shrike; 2) obtain baseline loggerhead shrike population data in shrub-steppe habitat of eastern Washington; and 3) locate breeding territories for future research. Surveys were conducted in 1993 and 1994; results are reported by McConnaughey and Dobler (1994).

Leu and Manuwal (1996) studied the breeding and foraging ecology of loggerhead shrike in the shrub-steppe habitat on the Yakima Training Center in southcentral Washington. Nesting habitat was thoroughly characterized. Foraging habitat of both adults and juveniles was also characterized. Recommendations for conservation of loggerhead shrike at the site were provided.

Poole (1992) studied reproductive success and nesting habitat of loggerhead shrike in the shrub-steppe habitat on the Department of Energy's Hanford Site in southcentral Washington. She characterized nest sites and nest success based on an analysis of 297 nesting territories. She found loggerhead shrike densities at Hanford were 12-19 times greater than in the remainder of eastern Washington and concluded that the nesting habitat at the site was saturated. Recommendations based on research results were provided.

Vander Haegen et al. (2000) documented the abundance of shrub-steppe passerines relative to landscape and habitat variables in Washington. Loggerhead shrikes were significantly more abundant in sandy soil shrub-steppe communities compared to loamy and shallow soil shrub-steppe communities. Shrikes did not vary in abundance among sites in good, fair, and poor range condition (an index of the proportion of

exotic versus native plants in the herbaceous understory).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: M. Vander Haegen (pers. comm.) noted: "Conversion of shrub-steppe to agriculture and urban/suburban development is likely the dominant cause of habitat loss for shrikes in eastern Washington. Shrub-steppe communities on loamy and sandy soils have been converted at a disproportionally high rate (a trend that will likely continue), indicating greater loss of habitat for species that prefer communities on these soil types."

No other threats were noted.

Habitat Requirements and Condition

Poole (1992) characterized shrub-steppe habitat used by loggerhead shrike at the Hanford site.

Vander Haegen et al. (2000) documented that loggerhead shrikes were significantly more abundant in sandy soil shrub-steppe communities compared to loamy and shallow soil shrub-steppe communities.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in Washington are *L.l. gambeli*.

Loggerhead Shrike Conservation Activities in the State

None noted.

U.S. FISH AND WILDLIFE SERVICE REGION 2

Arizona, New Mexico, Oklahoma, Texas

ARIZONA

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike breeds nearly statewide in suitable habitat. Historic and current range are considered similar. Throughout most of its range in the state, the species is a year-round resident, except that numbers are reduced in winter in the northern third of the state (primarily above 5,000 ft).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -4.5 P=0.07 N=42
BBS Trend 1966-1979: -8.6 P=0.56 N=20
BBS Trend 1980-1998: -5.4 P=0.00 N=38

BBS data for Arizona suggest that the population is declining. Troy Corman (Arizona Game and Fish

Department, pers. comm.) characterized the population as stable.

1993-1997 data from the Arizona BBA confirm widespread distribution of the species.

CBC Trend 1959-1988: -2.3 Significance ** N=46

State Legal Status

None

Current Research and Monitoring

None

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Factors contributing to loss and degradation of habitat include: urban sprawl and development; agriculture; local nest tree damage by wild burros, especially in drought years; and wild fires in Sonoron desert habitat (T. Corman, pers. comm.).

Other natural or manmade factors affecting its continued existence: Pesticide use for agriculture may be a problem (T. Corman, pers. comm.).

Other threats to the species were characterized as unknown.

Habitat Requirements and Condition

T. Corman (pers. comm.) noted that loggerhead shrike nest success in Arizona is highly variable; nesting conditions are much more favorable during years with higher precipitation during fall and winter.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), the subspecies *L.l. nevadensis* breeds in northern Arizona, *L.l. sornoriensis* breeds in southern Arizona, and there is a broad zone of intergradation between the 2 subspecies across the central portion of the state. *L.l. gambeli* winters statewide (T. Corman, pers. comm.).

Loggerhead Shrike Conservation Activities in the State

No perceived need for conservation activities directed at loggerhead shrikes in the state (T. Corman, pers. comm.).

NEW MEXICO

Historic and Current Range of the Loggerhead Shrike

The check-list of the birds of New Mexico (Hubbard 1978) listed the loggerhead shrike as: "Resident statewide (less numerous and less widespread in winter in the north); rare to fairly common in more open habitats ... at lower and (locally) middle elevations. Casual at higher elevations." Ligon (1961) noted

that the species breeds at elevations up to 7,000 feet in the state. Generalized distribution information is reliable and current (Sartor Williams, New Mexico Dept. of Game and Fish, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -6.9 P=0.00 N=50
BBS Trend 1966-1979:-10.4 P=0.01 N=22
BBS Trend 1980-1998: -3.8 P=0.00 N=46

BBS sample sizes are considered adequate to estimate state trends. No statewide population estimates are available (S. Williams, pers. comm.). BBS trends indicate that populations have steadily declined since initiation of the survey.

CBC Trend 1959-1988: -0.8 Significance: NO N=28

State Legal Status

The species is not State-listed as threatened or endangered, but songbirds are specifically protected from being "trapped, killed or injured" by state regulations (S. Williams, pers. comm.).

Current Research and Monitoring

None (S. Williams, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Degree of habitat loss is unknown. Suitable habitat does not currently appear limiting (S. Williams, pers. comm.).

Overutilization for commercial, recreation, scientific, or educational purposes: No

Disease or predation: No indication of a problem.

Inadequacy of existing regulatory mechanisms: No.

Other natural or manmade factors affecting its continued existence: Possibly pesticides, including herbicides used to control brush on rangelands (S. Williams, pers. comm.).

Habitat Requirements and Condition

Loggerhead shrikes breed in a variety of habitats in New Mexico, including mesquite grasslands, desert grasslands, open riparian area, juniper savannahs, rows of trees in agricultural areas, yucca grasslands, and creosote bush deserts (S. Williams, pers. comm.). Bailey (1928) noted that thorny trees were favored nest sites, including yucca, mesquite, and osage orange.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), *L.l. excubitorides* breeds along the eastern border of New Mexico, *L.l. nevadensis* breeds in the northwest corner, *L.l. sornoriensis* breeds in the southwest; there is potential for intergradation among the 3 subspecies across most of the state. However, note that *L.l. nevadensis* is not

widely recognized (AOU 1957, Rand 1960) and many authorities include *L.l. sonoriensis* with *L.l. excubitorides*.

Loggerhead Shrike Conservation Activities in the State

No conservation activities have targeted shrikes. However, New Mexico PIF considers it a priority species and this may result in increased management attention for the species (S. Williams, pers. comm.).

OKLAHOMA

Historic and Current Range of the Loggerhead Shrike

Both historic and current breeding distribution of loggerhead shrikes in Oklahoma are statewide; the species is well distributed in the western half of the state and has patchy distribution in the more heavily forested eastern half. The species also winters throughout the state, although individuals are not necessarily resident at a given location (Mark Howery, Oklahoma Department of Wildlife Conservation, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -4.9 P=0.00 N=57
BBS Trend 1966-1979: -3.1 P=0.01 N=33
BBS Trend 1980-1998: -4.7 P=0.00 N=55

BBS sample sizes are adequate to estimate statewide trends. A statewide monitoring program would likely yield additional information (M. Howery, pers. comm.).

BBS data are the only state population trend data available. M. Howery (pers. comm.) noted that the population decline documented by BBS probably reflects the population trend for the eastern half of the state, but that western Oklahoma has "not experienced a significant population change."

CBC Trend 1959-1988: -1.5 Significance ** N=25

State Legal Status

Special Concern. Designation does not afford the species any additional protection beyond MBTA protections, but it does raise the funding priority of shrikes by the Oklahoma Wildlife Diversity Program (M. Howery, pers. comm.).

Current Research and Monitoring

The Oklahoma Wildlife Diversity Program is currently providing partial funding for a study of loggerhead shrike breeding territory mapping and distribution in Comanche County, where the species is fairly common.

Tyler (1994) studied nest site selection by loggerhead shrike in southwestern Oklahoma from 1985-1988; 133 shrike nests were located in 23 species of woody plants.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Forest land is increasing in eastern Oklahoma as a result of fire suppression and abandonment of "family farms." "Many of the pastures previously occupied by shrikes were the result of forest clearing. The declines we are now experiencing in eastern Oklahoma may be a return to the presettlement shrike distribution and population size (M. Howery, pers. comm.)."

Other natural or manmade factors affecting its continued existence: Increased mortality as a result of increased vehicular traffic and speed may be an overlooked human-created source of mortality.

Other potential threats were not considered limiting to shrikes.

Habitat Requirements and Condition

Loggerhead shrikes occur in tallgrass, mixed grass and shortgrass prairies, as well as mesquite and shinnery oak savannahs in Oklahoma. Much of the mixed and shortgrass prairie has been converted to cropland. Most remaining shrike habitat is privately owned ranchland. Shrikes occur in several man-made habitats, including airports, but the number of birds in these habitats is small.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), *L.l. migrans* breeds throughout most of Oklahoma, with intergradation to *L.l. excubitorides* in the western half of the state.

Loggerhead Shrike Conservation Activities in the State

No management projects have targeted shrikes.

TEXAS

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike is a widespread year-round resident in Texas. With the exception of extreme southern Texas, the species breeds, or has bred, throughout the state (Mark Lockwood, Texas Parks and Wildlife Dept., pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -3.7 P=0.00 N=124
BBS Trend 1966-1979: -2.2 P=0.17 N= 78
BBS Trend 1980-1998: -3.3 P=0.00 N=115

While BBS sample sizes are considered adequate to estimate statewide trends, coverage is not uniform across the state and there are gaps in coverage, particularly in south and west Texas (Felipe Chavez-Ramirez, Texas A&M University, pers. comm.).

BBS documents significant statewide population declines for loggerhead shrike in Texas; however, trends are not uniform across the state. Peterjohn and Sauer (1995) analyzed BBS trends by

physiographic strata for the period 1966-1993; they noted that (continentwide) the Edwards Plateau of Texas was the only strata that supported shrike breeding populations that were significantly increasing (average rate of 7.0% annually, P>0.01).

Texas PIF evaluated loggerhead shrike population trends in 9 physiographic regions in Texas (Riley 1996). Shrike populations were considered stable in 7 and declining in 2.

CBC Trend 1959-1988: -1.3 Significance ** N=124

State Legal Status

No State status.

Current Research and Monitoring

F. Chavez-Ramirez (pers. comm.) has initiated a broad survey of shrike ecology in south Texas. Components of this study include: 1) evaluating nest success and productivity in urban areas; 2) conducting year-round monthly road surveys on coastal grasslands and south Texas brushlands; 3) evaluating wintering ecology of loggerhead shrike in coastal grasslands relative to perch use and competitive interactions with American kestrels; and 4) trapping and banding shrikes to determine the proportion of migratory versus resident birds during winter months.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Changing land use practices have no doubt affected shrikes in Texas, but changes have not been sufficient to be considered a threat to the continued existence of the species in the state (M. Lockwood, pers. comm.).

Overutilization for commercial, recreation, scientific, or educational purposes: Not considered a factor (F. Chavez-Ramirez, pers. comm.).

Disease or predation: Predation of nests and nestlings appears to be a problem for urban-nesting shrikes in south Texas. In Kingsville, Texas, nest predation at all stages combined was 40% during the spring and summer of 1997; feral cats appear to be one of the most significant predators (F. Chavez-Ramirez, pers. comm.). S. Craig (pers. comm.) noted that in her shrike research she noted markedly fewer young shrikes (relative to the number of adults) along the Gulf Coast of Texas, compared to other populations she had studied. She suggested that nest and fledgling predation by great-tailed grackles (*Quiscalus mexicanus*) may contribute to the low young:adult ratio, but noted that documentation was needed.

Inadequacy of existing regulatory mechanisms: Not noted.

Other natural or manmade factors affecting its continued existence: Pesticide impacts considered likely (F. Chavez-Ramirez, pers. comm.).

Collisions with vehicles may also be a significant threat. Flickinger (1995) counted road-killed birds along a 6.4 km stretch of road in the coastal plain of southern Texas between 1970-1987. Shrikes accounted for 101 of the 1,329 avian fatalities, and, depending on year, ranked third to sixth in frequency of mortality among all species. F. Chavez-Ramirez (pers. comm.) has also observed large numbers of dead shrikes on roads in south and west Texas.

Habitat Requirements and Condition

Shrikes use a wide range of vegetation associations in Texas, ranging from deserts to coastal grasslands. Potential habitat is widespread and occurs mostly on private land. In south Texas, park-like settings with scattered trees and short grass (city parks, university campus, cemeteries, etc.) appear to be favored by nesting shrikes (F. Chavez-Ramirez, pers. comm.). S. Craig (pers. comm.), based on research conducted in Texas, also commented that shrikes in that state appear to be "adapting to life in suburbia." During winter months, shrikes appear to be more evenly distributed between urban park-like settings and natural vegetation associations.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in most of Texas are assigned to *L.l. excubitorides*, with intergradation with *L.l. migrans* in the east and with *L.l. sonoriensis* in the west. M. Lockwood (pers.comm.) noted that in addition to these 3 subspecies, *L.l. ludovicianus* and *L.l. gambeli* have been identified (based on specimens) in the state; the season in which these specimens were collected was not indicated.

Loggerhead Shrike Conservation Activities in the State

None noted.

U.S. FISH AND WILDLIFE SERVICE REGION 3

Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin

ILLINOIS

Historic and Current Range of the Loggerhead Shrike

Historic data indicate that the loggerhead shrike was once distributed statewide in Illinois, but had disappeared from the northern and central portions of the state between 1965-1972 (Graber et al. 1973). Roadside surveys in 1990 confirmed that loggerhead shrike was largely confined to the southern third of the state and had not changed substantially since the early 1970s. Graber et al. (1973) described the loggerhead shrike as a regular winter bird in southern Illinois, but noted that it is not known if these birds represent a nonmigratory remnant breeding population, winter migrants, or a combination. James Herkert (Illinois Endangered Species Protection Board, pers. comm.) noted that the loggerhead shrike is still relatively common in southern Illinois in winter, and occasional elsewhere in the state.

The Illinois BBA (1986-1991) found loggerhead shrikes to occur as confirmed or probable breeders in 187 of 1,287 (14.5%) atlas blocks statewide, including records in 69 of the state's 102 counties. J. Herkert (pers. comm.) noted that BBS data suggest that loggerhead shrike populations in northern Illinois were unusually high during the BBA period; a result which does not accurately reflect loggerhead shrike distribution in the state. Since the BBA ended, there have been fewer breeding loggerhead shrikes in northern Illinois.

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -5.4 P=0.07 N=34
BBS Trend 1966-1979: -5.6 P=0.38 N=20
BBS Trend 1980-1998: -3.1 P=0.14 N=29

Reports that shrike populations in northern and central Illinois were declining began as early as 1910 (Graber et al. 1973). Graber et al. (1973) reported that the number of shrikes observed on a roadside survey of a 36 square-mile agricultural area in central Illinois declined from 13 pairs of shrikes in 1957 to zero in 1966. J. Herkert (pers. comm.) noted that while the species does still occur in northern and central Illinois, it is at much lower densities than in the southern part of the state.

BBS data confirm that shrike populations have continued to decline in recent years. In 1996, Illinois recorded only 10 shrikes on BBS routes in Illinois, the fewest ever recorded. The 1996 total is about 66% below the 30 year average of 30 birds for the state's core 64 routes. Range and population estimates are reasonably reliable and current; additional surveys are not needed to determine the status of the species in the state (J. Herkert, pers. comm.).

CBC Trend 1959-1988: 0.3 Significance: NO N=43

CBC data document declines in wintering shrikes in Illinois. Preliminary trend analysis of CBC data show loggerhead shrikes to be declining at a rate of nearly 4% per year between 1966-1995 (J. Herkert, pers. comm.).

State Legal Status

State Threatened. Take of individuals is prohibited, but habitat protection is limited (J. Herkert, pers. comm.).

Current Research and Monitoring

Breeding shrike populations are monitored at Midewin National Tallgrass Prairie (Will County) and at Prairie Ridge State Natural Area (Jasper County). At Midewin, nest success of 6-15 pairs of shrikes has been monitored annually since 1994 (J. Herkert, pers. comm.).

Threats to the Loggerhead Shrike in the State

Source of information on threats is J. Herkert (pers. comm.) unless otherwise noted.

The present or threatened destruction, modification, or curtailment of its habitat or range: Graber et al. (1973) noted that there were 2 phases in the disappearance of shrikes from northern and central Illinois. A relatively slow decline beginning around 1900, probably related to the removal of hedgerows, and a very rapid decline from 1957-1965 from unknown causes.

J. Herkert stated that habitat loss is "undoubtedly the biggest problem for nesting shrikes in Illinois." He noted that in a 1995-1996 study, approximately 20-30% of nest sites used in 1995 were destroyed prior to the 1996 breeding season.

Overutilization for commercial, recreation, scientific, or educational purposes: Not a factor.

Disease or predation: Probably not a factor. However, Collins (1996) evaluated breeding and wintering ecology of the loggerhead shrike in southern Illinois and documented that predation was the most common cause of nest failure.

Inadequacy of existing regulatory mechanisms: There is no existing regulatory mechanism to protect the habitat of the species.

Other natural or manmade factors affecting its continued existence: Anderson and Duzan (1978) evaluated DDE residues and eggshell thinning in loggerhead shrikes in Illinois and concluded:

> "Investigations in southern Illinois in 1971 and 1972 suggest that the Loggerhead Shrike has been contaminated with DDE and that the species has experienced eggshell thinning. Mean concentrations of DDE were 21.89 ppm in fat of 69 birds and 3.09 ppm in the contents of 104 eggs. A negative correlation was found between concentrations of DDE and eggshell thickness, and the mean value for the shell thickness index was 2.57% less for eggs collected during the study than for eggs in archival collections. However, nesting success was high, suggesting that the factor -- DDE or other -- causing the recent decline of the shrike population in Illinois was more closely associated with survival of fledged juveniles or adults than with reproduction."

J. Herkert analyzed pesticide residues in Illinois shrike eggs between 1995-1996. He found that current DDE residue levels in Illinois loggerhead shrike eggs are significantly lower than levels reported by Anderson and Duzan (1978).

Habitat Requirements and Condition

Smith (1990) found that loggerhead shrikes preferred pasture and hay meadows in southcentral Illinois. More than two-thirds of active nests were in solitary trees, and the remainder were in hedgerows. Smith and Kruse (1992) found that Illinois loggerhead shrikes were most common near pastures, hedgerows, cornfields, and residential lawns.

Lane (1989) studied 30 nests along a 130 km roadside route in southcentral Illinois in 1986. Nests in isolated trees had higher nest success than fencerow nests, probably because fencerows provide travel lanes for predators. Four variables were considered crucial to nest site selection of loggerhead shrike in southcentral Illinois: a suitable nest tree; short grass for foraging; close proximity to a high utility lines; and an impaling site.

Loggerhead shrike occurs primarily on private land in Illinois. Illinois Natural Heritage Database shows that 132 of 145 (91%) known shrike nesting locations tracked by the database occur on private land (J. Herkert, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in Illinois are *L.l. migrans.* Graber et al. (1973) verified this identification based on 75 specimens in the Illinois Natural History Survey collection. Graber et al. (1973) further stated that 14 winter specimens examined were all assigned to *L.l. migrans*.

Loggerhead Shrike Conservation Activities in the State

Some habitat management for shrikes occurs at Midewin National Tallgrass Prairie. Specific management activities that benefit shrikes include: 1) maintain short grass habitat with grazing; 2) clear

overgrown pastures to restore short grass habitat; and 3) maintain some short (less than 15 ft) thorny trees (usually osage orange) when restoring overgrown pastures (J. Herkert, pers. comm.).

INDIANA

Historic and Current Range of the Loggerhead Shrike

During presettlement times most of the state was forested, and the loggerhead shrike was probably absent from exclusively forested areas. By the early 1900s, much of the state had been cleared for agriculture. Butler (1898) considered the loggerhead shrike a common summer resident in Indiana. Burton and Whitehead (1990) contrasted county nest records prior to and after 1980 and noted a drastic reduction in range. Rabenold (1987) also noted a sharp decline in the number of Indiana counties with loggerhead shrike breeding season records since 1970. Surveys in the late 1980s revealed that loggerhead shrike is restricted to southern Indiana, primarily in the southwestern portion of the state (Burton and Whitehead 1990). Indiana's BBA, conducted from 1985-1990, confirmed that breeding records for the species were concentrated in southwest Indiana. Recent records in northern Indiana are widely scattered.

BBA (1985-1990): Probable or confirmed nesting of loggerhead shrike was detected in 22 of Indiana's 647 Priority Blocks (Whitehead 1998).

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 44 birds on 10 BBS routes in Indiana. Data are inadequate to estimate state trends.

Burton and Whitehead (1990) conducted a study in 1988-1989, in part to determine the breeding distribution and status of loggerhead shrikes in Indiana. They found an estimated 172 adult shrikes in 17 counties in 1988, and 249 adults in 16 counties in 1989. (They attributed the increase in sightings from 1988 to 1989 to coverage of additional areas). These should be viewed as minimum population estimates. Core populations were likely all located, but some individual pairs were missed (John Castrale, Indiana Department of Natural Resources, pers. comm.). Results suggested that Indiana's shrike population was larger than was previously believed, and that it was confined almost entirely to the southern third of the state. The 3 southwestern counties of Daviess, Dubois, and Spencer accounted for 77% of confirmed nest sites.

CBC Trend 1959-1988: -0.7 Significance: NO N=23

State Legal Status

State Endangered. Protects individuals from harm and taking, but does not protect habitat (J. Castrale, pers. comm.).

Current Research and Monitoring

A resurvey of areas where Burton and Whitehead (1990) found the greatest densities of loggerhead shrike was conducted during 1999 and 2000 breeding seasons. During 2000, shrikes were found at 44 sites in 2 counties (Daviess and Dubois); during 1989, shrikes had been found at 88 locations in the same counties (J. Castrale, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: A variety of practices and land use changes may negatively impact breeding loggerhead shrike populations: residential development in rural areas; clearing of shrubs and trees along roadsides and field borders; natural succession to more forested conditions; preponderance of rowcrop fields; and loss of grasslands and pastures. Sharp declines in shrike numbers were coincident with a 53% loss of open pastureland in the state between 1950-1980 (Burton 1993).

Overutilization for commercial, recreation, scientific, or educational purposes: Few, if any, taken for commercial, recreation, scientific, or educational purposes (J. Castrale, pers. comm.).

Disease or predation: No disease problems have been implicated in the decline of loggerhead shrikes. Predation of eggs, nestlings, and fledglings is common. Several species of mammals, bird, and snakes are potential predators of loggerhead shrike. Predation may be exacerbated because loggerhead shrikes favor linear habitats for nesting (J. Castrale, pers. comm.).

Inadequacy of existing regulatory mechanisms: Inability to regulate land uses and practices hampers efforts to provide and maintain habitat for loggerhead shrike (J. Castrale, pers. comm.).

Other natural or manmade factors affecting its continued existence: Potential factors include collisions with vehicles, pesticides, and competition with American kestrels and European starlings for food (J. Castrale, pers. comm.).

Habitat Requirements and Condition

Grasslands, pastures, shrublands, and shrubby or tree-lined field borders are good shrike habitat. Reclaimed mineland offers potential for loggerhead shrike. Burton and Whitehead (1990) showed that rural roads, utility lines, fencelines, pastures, and lawns were important features in Indiana shrike territories. They also found that shrike territories appeared to be associated with Amish communities in Indiana. They discussed specific qualities of Amish communities (e.g. low pesticide and fertilizer use, minimal automobile traffic, self-sufficient farms necessitate maintenance of pasture for livestock, etc.) that may benefit shrikes.

Subspecies of Loggerhead Shrike Occurring in the State

According to Miller (1931), Indiana shrikes are *L.l. migrans.* Burton and Whitehead (1990) concluded, based on wing-chord measurements, that both *L.l. migrans* and *L.l. ludovicianus*, or an intergrade between the 2 subspecies, may be present.

Loggerhead Shrike Conservation Activities in the State

None specific to loggerhead shrike. Retention of fencerows and roadside habitat favorable to game animals has been a priority of many Indiana Department of Natural Resource programs, and these should directly benefit loggerhead shrike (J. Castrale, pers. comm.).

IOWA

Historic and Current Range of the Loggerhead Shrike

During the Iowa BBA (conducted 1985-1990), loggerhead shrikes were reported in 186 blocks (26%) throughout Iowa, except for the northeastern part of the state. Approximately 51% of the observations were rated possible, 15% probable, and 32% were confirmed (Hemesath 1996).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -10.0 P=0.00 N=19
BBS Trend 1966-1979: -9.2 P=0.02 N=12
BBS Trend 1980-1998: -8.2 P=0.00 N=15

Historically, the loggerhead shrike was considered a common summer resident in all parts of the state, but less common in northern Iowa. At present the loggerhead shrike nests statewide but is most common in southern Iowa, where the species also overwinters. Of the 288 fall and winter reports from 1960 to 1981, 93% were from southern Iowa (Hemesath 1996).

CBC Trend 1959-1988: 0.4 Significance: NO N=20

State Legal Status

Special Concern (Hands et al. 1989).

Current Research and Monitoring

DeGeus (1990) evaluated productivity and habitat preferences of loggerhead shrikes inhabiting roadside habitat in Iowa. Nest success (35%) and productivity (2.2 young/pair) were low compared to most other studies of the species. High rates of nest predation (86% of all losses) were observed. The researcher speculated that linear habitats attracted birds to areas where heavy predation limited production to levels that were below those needed for replacement and concluded that "hedgerows and fencelines are not necessarily optimal or even adequate nesting habitat, contrary to some earlier assumptions."

Threats to the Loggerhead Shrike in the State

Other natural or manmade factors affecting its continued existence: DeGeus (1990) found that most of the remaining shrike habitat in Iowa was along roadsides. High rates of nest predation in roadside habitats limit productivity; roadside habitats may be a population sink for the species in the state.

No additional information on threats was provided.

Habitat Requirements and Condition

The loggerhead shrike is found in areas with hedgerows and scattered trees and bushes. They tend to build their nests in low, shrubby plants (Hemesath 1996). Much of the remaining habitat in the state occurs along roadsides (DeGeus 1990).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in Iowa are *L.l. migrans.*

Loggerhead Shrike Conservation Activities in the State

No response.

MICHIGAN

Historic and Current Range of the Loggerhead Shrike

Brewer et al. (1991) cited historical accounts which suggested that the loggerhead shrike probably bred in the oak openings of southern Michigan prior to European settlement, and greatly increased its numbers and range as pastures and hedgerows spread across the land. Accounts from around Chicago, southwestern Michigan, and southeastern Michigan during the late 1800s and early 1900s all described the species as common.

The loggerhead shrike currently breeds sporadically statewide, and is occasionally found wintering in the southern third of Michigan (Mary Rabe, Michigan Natural Features Inventory, pers. comm.).

BBA (1983-1988): Only 21 of 1,896 townships in Michigan reported evidence of breeding shrikes; 48% of records (a total of 10) were probable or confirmed (Brewer, McPeek, and Adams 1991). Records are scattered throughout the Lower Peninsula, with a concentration of breeding pairs within 16 km of a Great Lakes shoreline.

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 13 birds on 6 BBS routes in Michigan. Data are inadequate to estimate state trends.

Adams and McPeek (1994) wrote: "Early writings indicate that the Loggerhead Shrike was once a fairly common summer resident in Michigan's Lower Peninsula, with nesting records from most counties. Reduced numbers were apparent in the 1960s and 1970s, but it was not until the Breeding Bird Atlas (1983-88), when fewer than 10 pairs were found, that the full extent of the decline was realized."

Little (1987a) noted that Michigan's loggerhead shrike population showed a steady decline since the 1960s, and that shrike distribution was shifting from the southeastern counties to the western and northern parts of the state.

Intensive statewide searches in 1986 and 1987 resulted in finding 1 breeding pair (Little 1987a) and 4 breeding pairs (Little 1987b), respectively. M. Rabe (pers. comm.) noted: "We have no current population estimates... Clearly the population is decreasing and has reached a threshold level where new pairs are less likely to be reported because they are so rare and widespread."

The Michigan Audubon Society tracks known and former nesting locations. Because of low population densities, new locations of breeding pairs could not be found without intense searching. A larger scale monitoring program is probably not justified at this time.

CBC Trend 1959-1988: -0.6 Significance: NO N=16

State Legal Status

State Endangered. When proposed development projects are located near current or former nest sites, the Michigan Department of Natural Resources works through the environmental review process to limit or mitigate their impact. However, there is no practical way to protect suitable habitat that is not occupied, especially when several years have passed since the date of last known nesting at a site (M. Rabe, pers. comm.).

Current Research and Monitoring

None noted.

Threats to the Loggerhead Shrike in the State

M. Rabe (pers. comm.) noted the following threats: natural succession of grasslands; conversion of farmland; reduction in pasture and hay acreage as practice of confining cattle to feedlots increases; removal of hedgerows from farmlands; inability of males to attract mates at low population densities.

Habitat Requirements and Condition

Little (1987b) found Michigan shrikes (4 pairs located in 1987 statewide search) in habitats with low vegetation for foraging, multiple perches, and protective trees for nesting. Specific habitats used included a hedgerow adjacent to an agricultural area and scattered trees on a golf course, yard, and abandoned field. Most sites are on private land. Given current land use practices, it is not likely that new suitable habitat will be generated in the landscape (M. Rabe, pers. comm.)

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in Michigan are *L.l. migrans.*

Loggerhead Shrike Conservation Activities in the State

No conservation activities reported. Adams and McPeek (1994) commented:

> "The outlook for this species in Michigan is bleak. Breeding since the mid-1980s has been verified only at isolated locations in Allegan, Huron, Alcona, Benzie, and Grand Traverse counties, and pairs have not been consistently present at most of these locales. Biologists are unable to institute any specific management programs in the absence of information pinpointing the cause of their demise. Land-use changes which have reduced the amount of short-grass habitats and tree fencerows are one possible factor. So, too, is the widespread use of pesticides in areas where shrikes are likely to forage... At present, conservation efforts in Michigan need to be directed toward research, surveys, monitoring, and protection for all remaining breeding pairs and their habitats."

MINNESOTA

Historic and Current Range of the Loggerhead Shrike

Once considered a common breeding bird of the agricultural region of Minnesota, loggerhead shrike populations have sharply declined and the species is now considered rare, even in seemingly suitable habitat. Most recent (post-1990) records are concentrated in the southeastern portion of the state, particularly Dakota County (Eliason 1996).

Loggerhead shrike does not winter in Minnesota (Miller 1931).

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 86 birds on 15 BBS routes in Minnesota. Data are inadequate to estimate state trends.

As part of a research project in 1986 and 1987, Brooks (1988) found 29 nesting pairs of loggerhead shrikes in 12 counties in 1986, and 19 pairs in 1987. In the same counties a 1995-1996 survey located 18 nest attempts in 1995 and 10 nest attempts in 1996 (Eliason 1996). Population concentration areas were observed to shift between 1986 and 1995. For example, Sherburne County had 9 nest attempts in 1986, and only 1 in 1995, whereas Dakota County had 2 nest attempts in 1986, and 9 nest attempts in 1995.

CBC Trend 1959-1988: no trend reported

State Legal Status

State Threatened (Eliason 1996)

Current Research and Monitoring

A statewide project was conducted in 1995-1996. The statewide totals in the 1995-1996 survey were 24 nest attempts in 1995 and 13 in 1996. One objective of the project was to compare 3 survey methods to determine the most efficient method for monitoring the loggerhead shrike population in Minnesota. Eliason (1996) concluded: "Population numbers are so low and most of the birds so widely dispersed that none of the methods tested in this study are practical tools for tracking population changes. Strategies that would increase the probability of detecting shrikes when they are present are needed."

Threats to the Loggerhead Shrike in the State

The decline of loggerhead shrike in Minnesota is attributed to a combination of factors, including loss of habitat resulting from the conversion of pasture and grasslands to houses or cropland; the encroachment of forest and brush on pasture and grasslands; and changing farming practices that have resulted in larger fields with fewer trees, shrubs and fences. Increasing use of pesticides may also play a role in the decline of shrikes (Minnesota Dept. of Natural Resources 1996).

Habitat Requirements and Condition

Shrikes use grassy, open areas with scattered trees and shrubs such as pastures, prairie patches and grassy roadsides (Minnesota Dept. of Natural Resources 1996). Habitat occurs in areas with interspersed private and public land ownership.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931) the subspecies breeding in Minnesota would be *L.l. migrans*.

Loggerhead Shrike Conservation Activities in the State

The Minnesota Department of Natural Resources (1996) produced a fact sheet entitled: "Landowners Guide for Maintaining and Encouraging Loggerhead Shrikes." The fact sheet was published in the Dakota County Extension Service newsletter, which is distributed to over 20,000 households in the county. From 1997 to present, it has been distributed to landowners in Dakota County with shrike habitat or known territories on their land. The fact sheet has also been used statewide in public education efforts (Bonita Eliason, Minnesota Department of Natural Resources, pers. comm.).

MISSOURI

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike occurs year-round throughout Missouri, but is less numerous in the more forested Ozark Natural Division than in other parts of the state. Jacobs and Wilson (1997) noted that the loggerhead shrike may be one species that is currently more common in the Mississippi Lowlands than it was historically. In the early 1900s, the loggerhead shrike population in the Mississippi Lowlands was described as scarce; at that time the area contained extensive forests and swamps. Rowcrop fields and pastures that predominate in that area now are more appropriate for shrikes.

Winter distribution is shifted southward compared to breeding distribution. The source of wintering information is a roadside survey of 17-20 routes statewide conducted annually in January. CBCs also indicate a statewide winter distribution (James D. Wilson, Missouri Dept. of Conservation, pers. comm.).

BBA (1986-1992): Loggerhead shrike was reported in 672 (55.7%) of 1,207 blocks. Probable or confirmed nesting accounted for 62% of these reports (Jacobs and Wilson 1997).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -7.0 P= 0.00 N=48
BBS Trend 1966-1979: -6.6 P= 0.01 N=35
BBS Trend 1980-1998: -4.2 P= 0.15 N=41

Kridelbaugh (1981) evaluated the population trend of loggerhead shrikes statewide and in 5 ecological strata using 1967-1979 BBS data for Missouri. The statewide population exhibited a significant decline from 4.2 birds/route in 1969 to 1.7 birds/route in 1979, but declines did not occur in all ecological strata. The most significant decline occurred in northwest Missouri, and a decline also occurred in the southeast corner (bootheel) of the state.

J. Wilson (pers. comm.) noted that BBA and BBS surveys for Missouri provide current data on loggerhead shrike in the state and that "accuracy is favored by the conspicuousness of the species."

CBC Trend 1959-1988: -2.0 Significance *** N=36

Kridelbaugh (1982) noted that population declines have also been documented in the wintering

population of loggerhead shrikes in the state.

State Legal Status

Watch list (J. Wilson, pers. comm.).

Current Research and Monitoring

No efforts aimed specifically at loggerhead shrike. BBS, BBA, CBC and the statewide winter roadside survey conducted annually in January all provide information on this species.

Threats to the Loggerhead Shrike in the State

J. Wilson (pers. comm.) noted that grasslands have been reduced by rowcropping, succession, and urbanization. He cited increasing prevalence of fescue and the linear pattern of nesting cover (i.e. grown up fencerows) as factors in the deterioration of habitat conditions for loggerhead shrike in Missouri. There is no evidence that disease, overutilization, or predation are factors in the reduction of shrike numbers.

Habitat Requirements and Condition

Kridelbaugh (1982) noted that areas in Missouri with relatively high populations of loggerhead shrike were dominated by grasslands (Osage Plain, southern Ozarks). Where there had been a decline in pasture and hayfields and an increase in rowcrops, the number of breeding shrikes had declined (northwest and southeast Missouri). Most shrike habitat is on private land.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931) the subspecies breeding in Missouri is *L.l. migrans*; however, J. Wilson (pers. comm.) noted that no subspecies is recognized in the state.

Loggerhead Shrike Conservation Activities in the State

It is anticipated that the "Open Lands Initiative," an ongoing project in northern Missouri, will benefit grassland birds including shrikes. Monitoring is a component of this project (J. Wilson, pers. comm.).

OHIO

Historic and Current Range of the Loggerhead Shrike

Peterjohn (1989) noted: "When Ohio was initially settled, the virgin forests with few scattered openings did not support Loggerhead Shrikes. As these forests were cleared and replaced by open farmlands, Loggerheads quickly took advantage of the newly created habitats. They apparently invaded during the mid-1800's, becoming widely distributed before the turn of the century."

Trends toward intensive agricultural production in the mid 1900s led to contraction of the range of the loggerhead shrike in the state. The species is now considered an accidental to rare summer resident, with most records from the western half of the state.

BBA (1983-1987): Probable or confirmed nesting of loggerhead shrike was detected in 9 (1.2%) of Ohio's 764 atlas blocks.

The loggerhead shrike has always been considered an accidental to casual winter resident in Ohio. Most recent winter records are from the southern half of Ohio. Wintering loggerhead shrikes are not necessarily the same individuals that breed in Ohio (Peterjohn 1989).

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 25 birds on 10 BBS routes in Ohio. Data are inadequate to estimate state trends.

The largest statewide populations were present between 1900 and 1930. Beginning in the 1930s, the trend toward intensive agricultural production led to deteriorating habitat conditions for loggerhead shrike in Ohio. Widespread declines were noticeable by the late 1940s, and populations continued to shrink throughout the 1950s and 1960s. By 1970, only a few widely scattered pairs remained (Peterjohn 1989).

Peterjohn and Rice (1991) noted that if BBA (1983-1987) reports were representative of the number of shrikes remaining in Ohio, then the statewide population probably did not exceed 10-20 pairs.

CBC Trend 1959-1988: -0.5 Significance: NO N=28

State Legal Status

State Endangered (David Scott, Ohio Division of Wildlife, pers. comm.).

Current Research and Monitoring

None

Threats to the Loggerhead Shrike in the State

Peterjohn (1989) and Peterjohn and Rice (1991) cite changing land-use patterns.

Habitat Requirements and Condition

Only isolated, widely scattered, pockets of suitable habitat for loggerhead shrikes remain in Ohio (D. Scott, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931) the subspecies breeding in Ohio is *L.l. migrans*.

Loggerhead Shrike Conservation Activities in the State

None known.

WISCONSIN

Historic and Current Range of the Loggerhead Shrike

Fruth (1988) provided a discussion of the historic and current (through 1987) range of the loggerhead shrike in Wisconsin. Records are concentrated in the southern two-thirds of the state. Robbins (1991) confirmed that the range of the species has not changed in the state, although numbers have declined sharply. The species does not winter in the state.

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 27 birds on 10 BBS routes in Wisconsin. Data are inadequate to estimate state trends.

The Wisconsin BBA (1995-1999) documented records of confirmed breeding of shrikes from 11 sites in 10 counties, with a probable record from another county. All but 2 of these records were from the northern half of the state (David Sample, Wisconsin Department of Natural Resources, pers. comm.).

The loggerhead shrike was considered a common summer resident in Wisconsin in the early 1900s; population declines apparently began in the 1930s (Sumner Matteson, Wisconsin Department of Natural Resources, pers. comm.). The Wisconsin Society of Ornithologists (WSO) 1942 Checklist of Wisconsin birds listed the loggerhead shrike as a fairly common summer resident; the 1960 revised checklist listed the species as uncommon (Fruth 1988). Additional population declines occurred in the 1970s leaving the remaining breeding population scattered and unstable.

Based on WSO and Wisconsin Department of Natural Resource records, Fruth (1988) provided the following estimates of the Wisconsin breeding population:

1960-1967: average of 5.3 known breeding pairs per year
1968-1977: average of 1.7 known breeding pairs per year
1978: a peak of 11 breeding pairs was recorded
1979-1987: average of 4.0 known breeding pairs per year.

The apparent increase in the 1979-1987 period may be more indicative of an increase in search effort than an improvement in breeding status of the species.

Mossman and Lymn (1989) reported on a statewide loggerhead shrike survey based on nest sites that had been active in the previous decade. A total of 4 breeding records was recorded for the state. They concluded: "The Loggerhead Shrike appears to be continuing its long-term decline in Wisconsin. There is no indication that nest success is a problem, although data remain scant." In the 1990s, 1-5 breeding pairs have been reported annually (S. Matteson, pers. comm.).

The range of the species is accurately documented, but the population estimate is considered inadequate. Long-term systematic surveys in suitable breeding habitat are needed (S. Matteson, pers. comm.).

CBC Trend 1959-1988: no trend reported

State Legal Status

The loggerhead shrike was listed as threatened in Wisconsin in 1979 and reclassified to endangered status in 1982 (Fruth 1988). State law protects listed species from incidental take in Wisconsin; draft

incidental take protocol (for state agencies) has been developed for the loggerhead shrike and is currently under review (S. Matteson, pers. comm.).

Current Research and Monitoring

In 1999 Wisconsin completed the fifth year of a statewide BBA project, which provided information on distribution and numbers of shrikes in the state. However, this effort did not constitute a systematic survey of all shrike habitat. Shrike monitoring efforts will continue, but are typically local in nature (S. Matteson, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Some changes in habitat in the state may have negatively impacted shrikes. Area in pasture is currently only 37% of what it was in 1950. General trends toward clean farming have led to the removal of brush and hedgerows. Succession of brushland to young forest is also a factor in habitat loss (D. Sample, pers. comm.). Although there may be some adverse modifications to breeding habitat for loggerhead shrikes in Wisconsin, this is not generally considered a limiting factor (S. Matteson, pers. comm.).

Overutilization for commercial, recreation, scientific, or educational purposes: Not a factor; the species is protected from these threats by its state endangered status (S. Matteson, pers. comm.).

Disease or predation: S. Matteson (pers. comm.) stated: "Currently, there are no known disease or parasites that cause significant mortality for loggerheads. Research in this area, however, is limited. Shrikes do face natural predation pressure from hawks and owls, although this is not considered to be a significant threat." Fruth (1988) suspected that feral cats are probably a major predator of shrikes.

Inadequacy of existing regulatory mechanisms: A recovery plan for loggerhead shrikes in Wisconsin is in place (Fruth 1988), but additional research on breeding ecology is needed for effective management (S. Matteson, pers. comm.).

Other natural or manmade factors affecting its continued existence: Pesticides are a potential threat to the species, but the effects of pesticides on loggerhead shrikes are not well studied (Fruth 1988).

Habitat Requirements and Condition

Typical habitats in Wisconsin include pasture, old fields, and crop fields with adjacent hedgerows (Fruth 1988). Nests occur on both public and private land (S. Matteson, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931) the subspecies breeding in Wisconsin is *L.l. migrans*.

Loggerhead Shrike Conservation Activities in the State

Fruth (1988) discussed the Recovery Strategy for loggerhead shrike in Wisconsin, although the status of implementation of the plan was not reported. The Wisconsin Department of Natural Resources anticipates that ecoregional planning initiatives and PIF conservation plans in the state will result in landscape-scale as well as localized management efforts for loggerhead shrikes and other grassland/shrub-dependent species (S. Matteson, pers. comm.).

U.S. FISH AND WILDLIFE SERVICE REGION 4

Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee

ALABAMA

Historic and Current Range of the Loggerhead Shrike

Howell (1928) described loggerhead shrike as a fairly common, locally distributed, resident in the southern half of the state; he recorded migrant shrikes as occurring in "moderate numbers" during fall and winter throughout the state. Stevenson (1950) described the breeding range as the entire state, except in the mountains. Imhof (1976) noted that loggerhead shrike had been a common and well distributed breeding species throughout the state, even in the mountains associated with farms; the species was more abundant in winter. However, he noted a decline beginning approximately in 1960 that rendered the species uncommon, where formerly common.

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -7.6 P=0.00 N=71
BBS Trend 1966-1979: -3.5 P=0.30 N=40
BBS Trend 1980-1998: -6.5 P=0.00 N=65

BBS sample sizes are adequate to estimate statewide trends. Other than BBS data, no trend information was available for the state.

CBC Trend 1959-1988: -4.4 Significance *** N=23

State Legal Status

None (Bob McCollum, Alabama Game and Fish Division, pers. comm.).

Current Research and Monitoring

None (B. McCollum, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Paul Kittle (University of Northern Alabama, pers. comm.) noted the elimination of fencerows and hedgerows as a potential factor in the decline of loggerhead shrikes.

Other natural or manmade factors affecting its continued existence: P. Kittle (pers. comm.) provided information based on his personal observations in northwest Alabama over a period of more than 20 years. In an intensively farmed (primarily cotton) portion of western Lauderdale County shrikes were not common but occurred regularly until the late 1990s, when he observed an abrupt decline in sightings. The decline coincided with a period of intense pesticide use as part of a boll weevil eradication program,

which may have contributed to the decline.

No other threats were noted.

Habitat Requirements and Condition

No information provided.

Subspecies of Loggerhead Shrike Occurring in the State

Howell (1928) considered breeding restricted to the southern half of the state, and attributed all breeding to *L.l. ludovicianus*. Based on Miller (1931), breeding loggerhead shrikes in the southern half of Alabama are *L.l. ludovicianus*, with a zone of intergradation with *L.l. migrans* in the northern half of the state. Stevenson (1950) reported breeding records for northern Alabama and considered it likely that these birds represented *L.l. migrans*, but noted that the records were not based on specimens.

Loggerhead Shrike Conservation Activities in the State

None (B. McCollum, pers. comm.).

ARKANSAS

Historic and Current Range of the Loggerhead Shrike

The breeding range of the loggerhead shrike in Arkansas is likely statewide (although specific information on distribution was not available). The species also winters in the state; data collected by Kellner et al. (1999) suggested that most shrikes wintering in Arkansas also breed in the state.

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -7.5 P=0.00 N=28
BBS Trend 1966-1979:-11.0 P=0.00 N=26
BBS Trend 1980-1998:-10.7 P=0.04 N=25

BBS sample sizes are adequate to estimate statewide trends.

Using BBS data, Burnside and Shepherd (1985) noted a significant decline in numbers of breeding loggerhead shrikes between 1967-1983; statewide decline was most influenced by declines in the West Gulf Coastal Plain. The Interior Highlands region also showed significant decline. They suggested that the trend toward larger more intensively managed farms may have contributed to the decline.

CBC Trend 1959-1988: -2.4 Significance *** N=21

State Legal Status

None (Karen Rowe, Arkansas Game and Fish Commission, pers. comm.).

Current Research and Monitoring

Kellner et al. (1999) are studying patterns of population stability and habitat use by shrikes in northeastern and central Arkansas.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Burnside and Shepherd (1985) suggested that the trend toward larger more intensively managed farms may have contributed to the decline of loggerhead shrikes in the state.

No additional information on threats was provided.

Habitat Requirements and Condition

In northeastern Arkansas, habitat is dominated by rice, soybean, and wheat fields bordered by drainage ditches, isolated woodlots, and grassy roadsides. In central Arkansas, shrike habitat is dominated by pasture and hayfields (Kellner et al. 1999).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in Arkansas are *L.l. migrans*.

Loggerhead Shrike Conservation Activities in the State

No information provided.

FLORIDA

Historic and Current Range of the Loggerhead Shrike

Stevenson and Anderson (1994) described loggerhead shrike as a permanent resident throughout most of mainland Florida. Winter distribution was described as fairly common in north and central Florida except coastal areas, rare in extreme southern Florida, and casual on the Keys.

Yosef et al. (1993) presented evidence, based primarily on banding data, that suggested there is no movement of migrant shrikes into penisular Florida during the winter.

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -3.2 P=0.00 N=73
BBS Trend 1966-1979: -0.6 P=0.80 N=33
BBS Trend 1980-1998: -2.1 P=0.16 N=66

BBS sample sizes are adequate to estimate statewide trends.

Robertson and Woolfenden (1992) considered loggerhead shrike as fairly common to common in suitable habitat in the panhandle and northern peninsula; rare to uncommon and apparently decreasing in much of southern Florida.

Yosef et al. (1993) analyzed trends in numbers of loggerhead shrikes in southcentral Florida based on roadside counts conducted along 505 km of roads in summer and winter from 1974 to 1992. During that period, the winter population declined 37% and the summer population by 41%. Using the annual mean counts method, they estimated an annual rate of decline of 8.9% per year between 1976-1981, and a continued decline at the rate of 5.5% per year between 1981-1992. These rates of decline exceed estimates of decline for southcentral Florida based on BBS data (3.5% annual decline between 1986-1989).

CBC Trend 1959-1988: -2.9 Significance *** N=62

State Legal Status

None (John Milio, USFWS, pers. comm.).

Current Research and Monitoring

None known (Fred Lohrer, Archbold Biological Station, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Fred Lohrer (Archbold Biological Station, pers. comm.) noted the following activities as contributing to loggerhead shrike habitat destruction: conversion of agricultural areas and fallowland to residential developments; conversion of old fields to pine plantations; and conversion of pine flatwoods to open pasture with no woody vegetation.

Overutilization for commercial, recreation, scientific, or educational purposes: Not considered a factor (F. Lohrer, pers. comm.).

Disease or predation: Not considered a factor (F. Lohrer, pers. comm.).

Inadequacy of existing regulatory mechanisms: No comments received.

Other natural or manmade factors affecting its continued existence: Road kills are a potential threat (F. Lohrer, pers. comm.).

S. Craig (pers. comm.) noted that loggerhead shrikes in Florida are frequently associated with suburban habitat, including lawns, citrus groves, and golf courses. Loggerhead shrikes in these "artificial" habitats experience increased exposure to pesticides. A high incidence of leg and bill deformities were observed in birds captured in Florida in 1996; possible causes of deformities may merit further investigation.

Grubb and Yosef (1994) used ptilochonology to demonstrate that nutritional condition of loggerhead shrikes resident in southcentral Florida was related to habitat. Specifically, nutritional condition of shrikes in pasture was superior to that of birds in citrus groves. Mitacide/insecticide compounds used in citrus groves may, directly or indirectly, affect the condition of shrikes occupying that habitat.

Habitat Requirements and Condition

In Florida, loggerhead shrikes occupy a variety of open habitats with scattered trees and shrubs, these include prairies, pastures, open pine flatwoods, roadsides, and even urban parks and vacant lots

(Stevenson and Anderson 1994). Suitable habitat occurs primarily on private land (F. Lohrer, pers. comm.).

S. Craig (pers. comm.) noted a loss of natural nesting habitat in Florida, but observed that as natural habitat was lost, shrikes moved into suburban settings, including lawns, citrus groves, and golf courses.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in Florida are *L.l. ludovicianus; L.l. migrans* may occur in the northern portion of the state during winter (Stevenson and Anderson 1994). Both Rand (1960) and Phillips (1986) considered *L.l. miamensis* (described after Miller's work) as the breeding subspecies in extreme southern Florida. However, Stevenson and Anderson (1994) examined specimens and concluded that the subspecies *L.l. miamensis* was invalid.

Loggerhead Shrike Conservation Activities in the State

None noted.

GEORGIA

Historic and Current Range of the Loggerhead Shrike

Accounts from the early 1900s indicated that the loggerhead shrike occurred as a breeding and wintering species throughout the state, except in the Blue Ridge Mountains. The current range is similar, with the exception that the species does not occur in some local areas (Todd Schneider, Georgia Department of Natural Resources, pers. comm.).

The Georgia BBA documented shrikes in 117 of 159 counties in the state; many of the counties where shrikes were not found were inadequately sampled (T. Schneider, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -1.3 P=0.39 N=53
BBS Trend 1966-1979: -4.5 P=0.08 N=44
BBS Trend 1980-1998: -0.7 P=0.66 N=51

BBS sample sizes are adequate to estimate statewide trends.

Loggerhead shrikes are considered common with stable populations in the Coastal Plain of Georgia and declining but still fairly common in the Piedmont (T. Schneider, pers. comm.).

CBC Trend 1959-1988: -2.0 Significance: No N=29

State Legal Status

None (EJ Williams, Georgia Department of Natural Resources, pers. comm.).

Current Research and Monitoring

No current activities noted, but a winter bird atlas is planned that would provide information on wintering shrikes (T. Schneider, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Loggerhead shrike habitat has been lost to conversion (to unsuitable habitats) and to natural succession (T. Schneider, pers. comm.).

Other natural or manmade factors affecting its continued existence: Pesticides are a potential threat in the Coastal Plain and locally in the Piedmont, although there is no information to assess the potential impacts of pesticides (T. Schneider, pers. comm.).

No other threats were noted.

Habitat Requirements and Condition

Most shrike habitat occurs on private land (T. Schneider, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in most of Georgia are *L.l. ludovicianus*.

Loggerhead Shrike Conservation Activities in the State

Georgia has an active Farm Bill program as well as a program aimed at increasing bobwhite quail habitat. Both of these programs have emphasis on more open early successional habitat and should benefit shrikes (T. Schneider, pers. comm.).

KENTUCKY

Historic and Current Range of the Loggerhead Shrike

Loggerhead shrikes occupy a range throughout most of the western two-thirds or Kentucky, primarily west of the Cumberland Plateau (Mengel 1965); this range was confirmed by the Kentucky BBA (Palmer-Ball 1996). The status of the loggerhead shrike in presettlement Kentucky is unclear. Palmer-Ball (1996) noted that loggerhead shrikes may have occurred in the prairies and savannas of presettlement Kentucky, but potentially the grasses in these habitats were too tall and thick to be suitable for the species; outside of these areas the species was likely absent. The conversion of vast forested areas of the state to agriculture and settlement resulted in expansion of loggerhead shrikes to many areas.

Loggerhead shrikes are permanent residents of the state. The population may be augmented in fall and winter by the presence of migrants (Mengel 1965).

BBA (1985-1991): Loggerhead shrikes were recorded in almost 32% of priority blocks; almost 55% of priority block records were for probable or confirmed breeding (Palmer-Ball 1996).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -6.4 P=0.00 N=29
BBS Trend 1966-1979: -8.2 P=0.13 N=26
BBS Trend 1980-1998: -7.6 P=0.00 N=29

BBS data are still considered adequate to estimate state trends; however, Brainard Palmer-Ball, Jr., Kentucky State Nature Preserves Commission (pers. comm.) noted that sample sizes are somewhat a concern.

B. Palmer-Ball (pers. comm.) described loggerhead shrike as a never common but regularly occurring species in open farmland of southern and western Kentucky.

CBC Trend 1959-1988: -0.6 Significance: NO N=17

State Legal Status

None

Current Research and Monitoring

None

Threats to the Loggerhead Shrike in the State

B. Palmer-Ball (pers. comm.) noted no significant threats to loggerhead shrike in Kentucky, noting that the species is probably more numerous now compared to presettlement status.

Habitat Requirements and Condition

Kentucky loggerhead shrikes use open to semi-open farmland, one of the most abundant habitats in the state. Shrikes are rare to absent in extensive reclaimed surface mines of western Kentucky; potentially, grasses on the reclaimed mines are too tall and/or thick to provide preferred habitat (B. Palmer-Ball, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), *L.l. migrans* is the subspecies breeding in Kentucky. Mengel (1965) noted that, based on color and other characteristics, all Kentucky specimens were *L.l. migrans*. In spite of references to the contrary, it was his opinion that *L.l. ludovicianus* did not occur in the state.

Loggerhead Shrike Conservation Activities in the State

No efforts specific to shrikes noted. Sunni Lawless, Kentucky Department of Fish and Wildlife Resources (pers. comm.), noted that the State recommends to private landowners the benefits of planting/maintaining tree clumps as opposed to fencerows for wildlife habitat. Based on results of work conducted by Yosef (1994a), scattered tree clumps would be more beneficial to shrikes than trees/shrubs occurring along fencerows or other linear habitats.

LOUISIANA

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike is a statewide breeder in suitable habitat. BBA (field work completed in 1996) results indicated that the species was more common in the southwestern corner of the state and in agricultural areas along the Mississippi and Red Rivers than in central and northern Louisiana. Migrants augment the population in winter (Bill Vermillion, Louisiana Natural Heritage Program, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -0.7 P=0.53 N=45
BBS Trend 1966-1979: -0.5 P=0.82 N=23
BBS Trend 1980-1998: -0.3 P=0.78 N=40

BBS sample sizes are adequate to estimate state trends.

CBC Trend 1959-1988: -0.6 Significance: NO N=23

State Legal Status

No protection specifically for loggerhead shrike. However, loggerhead shrike, although not specifically referenced, is protected under State laws that prohibit illegal take of wild birds, nests or eggs.

Current Research and Monitoring

None

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: "Clean" agricultural practices result in much open habitat being unsuitable for loggerhead shrikes.

Other natural or manmade factors affecting its continued existence: No specific information available, but effects of agricultural chemicals are potentially a factor in decline that should be investigated.

No other threats were noted.

Habitat Requirements and Condition

Loggerhead shrikes are most often seen in fencerows along pastures and fields, roadsides, parks with scattered trees and large open areas, and airports. Most suitable habitat occurs on private land.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in the southeastern corner of Louisiana are assigned to *L.l. ludovicianus* and *L.l. migrans* breeds along the northern boundary with Arkansas. Intergradation between the subspecies occurs throughout most of the state.

Loggerhead Shrike Conservation Activities in the State

None

MISSISSIPPI

Historic and Current Range of the Loggerhead Shrike

No information provided.

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -4.8 P=0.03 N=33
BBS Trend 1966-1979: -0.7 P=0.76 N=20
BBS Trend 1980-1998: 0.1 P=0.97 N=31

BBS sample sizes are considered adequate to estimate state trends.

CBC Trend 1959-1988: -2.0 Significance * N=18

State Legal Status

Not listed (based on January 21, 2000 phone inquiry to the State Museum).

Current Research and Monitoring

No information provided.

Threats to the Loggerhead Shrike in the State

No information provided.

Habitat Requirements and Condition

No information provided.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in the southern half of Mississippi are assigned to *L.l. ludovicianus*, breeding birds in the northern third of the state are assigned to *L.l. migrans*, and intergradation between the 2 subspecies would occur throughout most of the central portion of the state.

Loggerhead Shrike Conservation Activities in the State

No information provided.

NORTH CAROLINA

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike apparently first bred in North Carolina in the early 1900s. The species reached the peak of its range in the state in the 1950s and 1960s, when it nested over most of the state. It has always been rare or absent in the northeastern corner as well as in the mountains. The current range has contracted; the species no longer breeds on the eastern border. It is found mainly in the Piedmont and western Coastal Plain (Harry LeGrand, Jr., North Carolina Natural Heritage Program, pers. comm.). Loggerhead shrike is a permanent resident, although some migratory movement occurs.

Irvin (1991) noted that North Carolina is near the northern boundary of present-day breeding populations of loggerhead shrikes in the eastern U.S..

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -15.2 P=0.00 N=24
BBS Trend 1966-1979: -19.6 P=0.00 N=15
BBS Trend 1980-1998: -2.8 P=0.76 N=16

BBS state trends are only estimated for species observed on a minimum of 14 routes. Note that trends for North Carolina for the 1966-1979 and 1980-1998 periods approach the route minimum. However, H. LeGrand, Jr., (pers. comm.) noted that large-scale declines documented by BBS and CBC trends are an accurate reflection of population trends in the state.

CBC Trend 1959-1988: -6.6 Significance *** N=44

State Legal Status

Special Concern

Current Research and Monitoring

No intensive statewide efforts.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Development and abandonment of former pasture have resulted in habitat loss.

Overutilization for commercial, recreation, scientific, or educational purposes: Not considered a factor.

Disease or predation: H. LeGrand, Jr. (pers. comm.) suspects that disease may be an issue, but notes that he has no data to support this.

Inadequacy of existing regulatory mechanisms: There is currently no regulatory authority to protect shrike habitat.

Other natural or manmade factors affecting its continued existence: Pesticides are suspected as a problem. The American kestrel and eastern kingbird, which use similar food resources, are also

declining.

H. LeGrand, Jr. (pers. comm.) noted that shrike decline has been geographic from north to south; he feels this issue should be investigated.

Habitat Requirements and Condition

Loggerhead shrike habitat is associated with agricultural areas, with pastures favored over cropland. As previously noted, much suitable habitat has been lost. Most habitat is associated with private land.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in the North Carolina are *L.l. ludovicianus*, with intergradation with *L.l. migrans* possible in the northern half of the state. Hall and LeGrand (undated) discussed distribution of the 2 subspecies in the state.

Loggerhead Shrike Conservation Activities in the State

Mark Johns (North Carolina Wildlife Resources Commission, pers. comm.) noted that North Carolina PIF is focusing on loggerhead shrike as a key species in declining early successional, open habitats. He noted that landowners are encouraged to implement management practices conducive to shrikes, such as maintaining hedgerows and red cedar restoration in pastures. (No details provided on how information is provided to landowners, or anticipated results).

SOUTH CAROLINA

Historic and Current Range of the Loggerhead Shrike

Loggerhead shrikes range throughout South Carolina, with the exception of the mountainous northwestern portion of the state. They are more abundant on the inner Coastal Plain than the Piedmont, especially since many of the small farms in the Piedmont have reverted to second growth forest. While shrikes have declined throughout South Carolina, the species is still fairly common in the inner Coastal Plain (John Cely, South Carolina Department of Natural Resources, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -3.5 P=0.00 N=24
BBS Trend 1966-1979: -8.6 P=0.03 N=17
BBS Trend 1980-1998: 3.5 P=0.27 N=17

J. Cely (pers. comm.) noted that the decline of loggerhead shrike documented by BBS is one of the steepest rates of decline noted for any bird in the state.

CBC Trend 1959-1988: -4.3 Significance *** N=18

State Legal Status

Special Concern

Current Research and Monitoring

During 1986, a roadside survey route along 44.8 km was conducted in Lower Richland County (located in the inner Coastal Plain), an area with "apparently healthy shrike populations." Thirty-four nests were located; density of shrikes per route was .29 birds/km (Cely and Corontzes 1986).

Gawlik and Bildstein (1990) studied reproductive success and nesting habitat of loggerhead shrike in northcentral South Carolina; seasonal habitat use and abundance of loggerhead shrike in the state (Gawlik and Bildstein 1993); and differential habitat use by sympatric loggerhead shrikes and American kestrels (Gawlik and Bildstein 1995).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: J. Cely (pers. comm.) considers habitat loss as the primary cause of loggerhead shrike declines throughout much of the species range, but notes that some areas of suitable habitat are unoccupied.

Cely and Corontzes (1986) documented changes in land use between 1939 and 1981 in Lower Richland County, the site of their 1986 loggerhead shrike study. They demonstrated that hedgerows declined and woodlands increased during that period, noting that both of these habitat changes would be detrimental to shrikes.

No additional threats were noted.

Habitat Requirements and Condition

Cely and Corontzes (1986) documented that loggerhead shrikes in Lower Richland County, the site of their 1986 loggerhead shrike study, were closely associated with residential dwellings. Twenty-five of 34 shrike nests located were found in yards. Loggerhead shrikes are also found associated with agricultural lands in the state, if suitable conditions exist.

Gawlik and Bildstein (1990) evaluated reproductive success and nesting habitat in northcentral South Carolina. Red cedar was the preferred nesting tree. Nests were associated with short-grass habitats (pastures, hayfields, lawns).

Gawlik and Bildstein (1993) demonstrated that in coastal South Carolina shrikes used disturbed grassy habitats, particularly pasture, during the breeding season, and occupied areas of cropland in autumn.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in the South Carolina are assigned to the nominate subspecies (*L.l. ludovicianus).*

Loggerhead Shrike Conservation Activities in the State

J. Cely (pers. comm.) noted that the longleaf pine-wiregrass ecosystem may have been the presettlement habitat of the loggerhead shrike in South Carolina. Efforts to restore that ecosystem may benefit shrikes.

TENNESSEE

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike occurs throughout Tennessee in low-elevation grasslands, croplands, and old fields, provided that scattered tree/shrubs or fencerows are available. It is present year-round, but is most common during winter. Breeding populations increase from east, where it is rare to uncommon, to west, where it is more common. The loggerhead shrike was probably uncommon and locally distributed in presettlement Tennessee, occurring in prairies in northcentral and northwest portions of the state (Nicholson 1997).

BBA (1986-1991): Loggerhead shrike was found in 57% of priority blocks (59% of these records were probable or confirmed breeding), most frequently in the Ridge and Valley, Central Basin, northcentral and southcentral Highland Rim, and the Loess Plain (Nicholson 1997). Nicholson (1997) noted that some local concentrations in Middle Tennessee were the result of special searches for shrikes.

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -7.4 P=0.00 N=35
BBS Trend 1966-1979: -4.8 P=0.00 N=34
BBS Trend 1980-1998: -6.7 P=0.00 N=28

BBS sample sizes in Tennessee are considered adequate to estimate trends.

Loggerhead shrike numbers probably peaked in the state between the 1940s and 1960s. The 7.3% annual decline documented by BBS between 1966-1996 is one of the largest declines for any species nesting in the state, but the species is still considered widespread (Nicholson 1997).

CBC Trend 1959-1988: -1.2 Significance: NO N=29

State Legal Status

Robert Hatcher (Tennessee Wildlife Resources Agency, pers. comm. in March 1998) noted that the loggerhead shrike was to be considered for “In Need of Management” listing in Tennessee (equivalent to “Special Concern” in many states) in late 1998; the outcome of this consideration is not known.

Current Research and Monitoring

None noted.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Nicholson (1997) suggested habitat loss was probably the major factor, but noted that much seemingly suitable habitat is unoccupied.

No other threats were noted.

Habitat Requirements and Condition

No specific habitat characteristics noted, but occurs primarily on private land (R. Hatcher, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in Tennessee are assigned to *L.l. migrans*.

Loggerhead Shrike Conservation Activities in the State

None (R. Hatcher, pers. comm.).

U.S. FISH AND WILDLIFE SERVICE REGION 5

Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia

CONNECTICUT

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike is considered a rare fall migrant in Connecticut, mostly along the coast. Historic records also indicate that the shrike was present in the state only as a migrant, with the frequency of visits decreasing in the 1970s and 1980s (Zeranski and Baptist 1990). The only documented nesting record from the state was from an apple orchard in 1893 (Zeranski and Baptist 1990).

Loggerhead shrike was not included in the state's BBA because it is not considered a breeding species (Dawn McKay, Connecticut Dept. of Environmental Protection, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS: No records of loggerhead shrike

State Legal Status

None, not considered a resident species.

Current Research and Monitoring

None (D. McKay, pers. comm.).

Threats to the Loggerhead Shrike in the State

No threats were noted.

Habitat Requirements and Condition

Not applicable.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), loggerhead shrikes migrating through Connecticut would be *L.l. migrans*.

Loggerhead Shrike Conservation Activities in the State

None.

DELAWARE

Historic and Current Range of the Loggerhead Shrike

There have been sporadic occurrences of loggerhead shrike in Delaware, most often in winter, throughout the last century. The species occasionally is found during the nesting season, but the only documented nest record is from 1924 (Christopher Heckscher, Delaware Department of Natural Resources and Environmental Control, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS: No records of loggerhead shrike.

Considered by the Delaware Natural Heritage Program as an historic nesting species. There are no currently known populations.

With only 1 known nest record, discussion of state population estimates or trends is not applicable. Surveys, particularly in coastal scrub-shrub environments, might find evidence of breeding. If present as a breeding species, loggerhead shrike is in very low numbers and probably not persistent from year to year (C. Heckscher, pers. comm.).

State Legal Status

None.

Current Research and Monitoring

None.

Threats to the Loggerhead Shrike in the State

Not applicable as there are no known populations.

Habitat Requirements and Condition

Coastal shrub-scrub communities, present on public and private land, represent potential habitat. Invasion by *Phragmites australis* could affect the potential suitability of these habitats.

Subspecies of Loggerhead Shrike Occurring in the State

L.l. migrans (Miller 1931).

Loggerhead Shrike Conservation Activities in the State

None.

MAINE

Historic and Current Range of the Loggerhead Shrike

As recently as 1963, the loggerhead shrike bred in Maine. Historic winter records are thought to be misidentified northern shrikes. Palmer (1949) classified loggerhead shrike as a "regularly uncommon and local" summer resident in the state, absent from islands and most of eastern Maine. It was probably also absent from the northern interior portion of the state, which was not cleared for agriculture (Thomas Hodgman, Maine Department of Inland Fisheries and Wildlife, pers. comm.).

BBA (1978-1983): Loggerhead shrike was reported on only 4 atlas blocks; the only evidence of breeding was 1 record of 3 shrikes together in July 1981 (Adamus 1987).

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 1 bird on 1 BBS route in Maine.

There are too few reliable records for this species to consider population size or trend. Palmer (1949) reported that the species was declining in Maine.

If loggerhead shrike is as rare and widely scattered as suspected, even an intensive monitoring effort targeting this species may yield extremely few records (T. Hodgman, pers. comm.).

State Legal Status

Special Concern, which confers no legal authority for protection (T. Hodgman, pers. comm.).

Current Research and Monitoring

None known, and no permits have been issued for capture or banding of this species (T. Hodgman, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Loss of farmland in southern and central Maine has probably been the most significant threat to loggerhead shrike in the state over the past century. Given extremely low numbers and spatial unpredictability of breeding occurrences, regulatory protections alone would be unlikely to benefit loggerhead shrike in Maine (T. Hodgman, pers. comm.).

Habitat Requirements and Condition

In spite of large losses of suitable habitat in historically occupied areas, apparently suitable (but unoccupied) habitat exists in Maine. Most potentially suitable habitat is on private land (T. Hodgman, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

L.l. migrans (Miller 1931).

Loggerhead Shrike Conservation Activities in the State

None specific to loggerhead shrike.

MARYLAND AND DISTRICT OF COLUMBIA

Historic and Current Range of the Loggerhead Shrike

Milburn (1981) reported confirmed and potential breeding records from 13 Maryland counties and the District of Columbia.

Four confirmed breeding records, all from Washington County or Frederick County, were documented during the BBA (1983-1987). In addition, there were 9 probable or possible breeding records recorded during the BBA; 6 of these records were also from Washington County or Frederick County (Glenn Therres, Maryland Department of Natural Resources, pers. comm.).

Milburn (1981) noted that the loggerhead shrike was considered a regular winter resident in Maryland. Bartgis (1992) reported that most winter reports of loggerhead shrike in Maryland were from the Great and Frederick Valleys and nearby areas of the Piedmont.

Historic and Current Population Estimates and/or Trends

Milburn (1981) reported that there were no loggerhead shrikes breeding records in Maryland prior to 1910. Breeding appeared to peak between 1910-1930, and then underwent a decline during the mid-1900s.

Between 1966-1996, loggerhead shrike was represented by 4 birds on 3 BBS routes in Maryland. Data are inadequate to estimate state trends. The species is currently considered potentially extirpated from the state (G. Therres, pers. comm.).

A marked decline in the number of loggerhead shrikes reported during CBCs has been noted since the early 1970s; declines have been most severe in coastal areas.

CBC Trend 1959-1988: -2.4 Significance: *** N=21

State Legal Status

State Endangered in Maryland.

Current Research and Monitoring

Loggerhead shrikes have not been actively monitored or studied in Maryland since 1996. Prior to that, research/monitoring included: searches for breeding localities; nest monitoring; and color banding. These efforts ceased primarily due to lack of active breeding sites (G. Therres, pers. comm.).

Threats to the Loggerhead Shrike in the State

Causes of population decline and possible extirpation are uncertain. A combination of factors may have contributed to the decline, including: habitat loss (e.g. development); alteration of habitat (e.g. farm abandonment, overgrazing of pastures); collisions with vehicles, especially juvenile shrikes; and landscape level habitat fragmentation (G. Therres, pers. comm.).

Habitat Requirements and Condition

Shrike habitat in the state is typically, lightly to moderately grazed pasture with scattered small trees, saplings, and shrubs, especially eastern red cedar. Also, nearby infrequently mowed hayfields for foraging are important. Presence of fences, utility wires, and other perches may be important as hunting perches (G. Therres, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

L.l. migrans (Miller 1931).

Loggerhead Shrike Conservation Activities in the State

None at present (G. Therres, pers. comm.).

MASSACHUSETTS

Historic and Current Range of the Loggerhead Shrike

Milburn (1981) reported verified and potential breeding records from 10 scattered counties in Massachusetts; no nests have been found since 1971. The species used to be considered an irregular and local breeder in the state, but was a regular migrant along the coast.

Historic and Current Population Estimates and/or Trends

BBS: No records of loggerhead shrike

State Legal Status

State Endangered.

Current Research and Monitoring

No information provided.

Threats to the Loggerhead Shrike in the State

No information provided.

Habitat Requirements and Condition

No information provided.

Subspecies of Loggerhead Shrike Occurring in the State

L.l. migrans (Miller 1931).

Loggerhead Shrike Conservation Activities in the State

No information provided.

NEW HAMPSHIRE

Historic and Current Range of the Loggerhead Shrike

Loggerhead shrike moved into New Hampshire in the late 1800s and was an uncommon and local summer resident for several decades. Milburn (1981) reported that there were 5 historic nest records; the last documented nesting was in 1910 (Foss 1994). Occasional sightings of individuals, primarily migrants, are recorded.

BBA (1981-1986): 3 sightings of individual birds were recorded during the atlas project.

Historic and Current Population Estimates and/or Trends

BBS: No records of loggerhead shrike.

There are too few records for this species to consider population size or trend. Current information suggests that the species no longer breeds in the state.

State Legal Status

State Endangered (Sara Cairns, New Hampshire Department of Resources and Economic Development, pers. comm.).

Current Research and Monitoring

None (John Kanter, New Hampshire Fish and Game Department, pers. comm.).

Threats to the Loggerhead Shrike in the State

No threats noted.

Habitat Requirements and Condition

New Hampshire is currently more than 85% forested; little suitable shrike habitat remains in the state (J. Kanter, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

L.l. migrans (Miller 1931).

Loggerhead Shrike Conservation Activities in the State

None specific to loggerhead shrike. Several State-listed species are associated with successional habitat; monitoring and habitat management conducted for these species could potentially benefit loggerhead shrike (J. Kanter, pers. comm.). However, Foss (1994) noted that it is unlikely that loggerhead shrike will become reestablished as a breeding bird in New Hampshire in the foreseeable future.

NEW JERSEY

Historic and Current Range of the Loggerhead Shrike

Two loggerhead shrike nests were confirmed in New Jersey in the 1890s; breeding season records since that time are limited to scattered observations, probably of migrant birds (Milburn 1981). In the early 1900s, the loggerhead shrike was described as a regular transient in the fall (Milburn 1981).

Historic and Current Population Estimates and/or Trends

BBS: No records of loggerhead shrike.

CBC Trend 1959-1988: -1.0 Significance: NO N=16

State Legal Status

State Endangered.

Current Research and Monitoring

No information provided.

Threats to the Loggerhead Shrike in the State

No information provided.

Habitat Requirements and Condition

No information provided.

Subspecies of Loggerhead Shrike Occurring in the State

L.l. migrans (Miller 1931).

Loggerhead Shrike Conservation Activities in the State

No information provided.

NEW YORK

Historic and Current Range of the Loggerhead Shrike

Loggerhead shrike was first reported in New York State in 1869 (Eaton 1914). It was a fairly common breeding species in central and western New York at the turn of the century (Eaton 1914). Bull (1974) noted a progressive decline in loggerhead shrike numbers in the 1930s and 1940s. The decline continued through the 1980s; the last known breeding in the State occurred in 1988 (Novak 1989). Historically, loggerhead shrike was also a relatively common migrant in New York, but in recent years only a handful of migrants have been reported during spring and fall (Peter Nye, New York State Department of Environmental Conservation, pers. comm.). There are occasional reports of loggerhead shrikes in winter, some of which may represent misidentification of northern shrikes.

BBA (1980-1985): Loggerhead shrike was recorded in 24 of New York's 5,335 atlas blocks. Probable or confirmed nesting of loggerhead shrike was detected in 13 blocks (Andrle and Carroll, 1988).

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 7 birds on 5 BBS routes in New York. Data are inadequate to estimate state trends.

In 1993, the New York Endangered Species Working Group (1993) noted that there had been no confirmed nesting in the state since 1988. This group categorized the loggerhead shrike as declining in New York.

No recent surveys have been conducted specifically for loggerhead shrike, but New York has a good network of bird watchers looking for rare species. It is likely the species would be detected if present in the state (P. Nye, pers. comm.).

CBC Trend 1959-1988: -0.2 Significance: NO N=21

State Legal Status

State Endangered. Protects individuals from taking, but does not protect habitat (P. Nye, pers. comm.).

Current Research and Monitoring

No current efforts known (P. Nye, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: P. Nye (pers. comm.) noted:

"A strong preference for pasture-land was shown by both historical records and more recent studies.

> Novak found that tall, isolated hawthorn shrubs were the most important nest sites. The timing of the shrike decline in New York State appears to coincide with a decline in pasture land. Novak states that the amount of optimal breeding habitat (pasture) has been reduced by 69% from 1920-1978. Abandoned farmland has become overgrown and unsuitable. Hedgerows have been removed."

Novak (1989) noted that while suitable habitat currently remains unoccupied, this finding does not negate the evidence that loss of breeding habitat is involved in the decline of the loggerhead shrike. However, factors other than the lack of available breeding habitat may be currently limiting the population.

Other natural or manmade factors affecting its continued existence: Other potential factors include: collisions with vehicles; pesticides; weather (cold, wet weather negatively affects reproduction). "Low return rates for banded birds provide evidence that post-fledging mortality is limiting the population (P. Nye, pers. comm.)."

Other threats were not considered limiting to shrikes in New York (P. Nye, pers. comm.).

Habitat Requirements and Condition

Apparently suitable, unoccupied loggerhead shrike habitat exists in New York, although it has declined. Novak (1989) developed a preliminary model of optimal shrike habitat in New York; active or recently active pastures at least 5.5 ha in size with trees/shrubs suitable for nesting and perching were the basis for the model. Potential shrike habitat occurs primarily on private land.

Subspecies of Loggerhead Shrike Occurring in the State

L.l. migrans (Miller 1931).

Loggerhead Shrike Conservation Activities in the State

P. Nye (pers. comm.): A New York recovery plan was drafted in the late 1980s, but was not implemented. Surveys of possible nesting areas were conducted until 1994, but no nesting has been documented since 1988. Restoration efforts are being considered in light of Ontario's plans to release captively-bred loggerhead shrikes.

PENNSYLVANIA

Historic and Current Range of the Loggerhead Shrike

Historically (late 1800s, early 1900s), loggerhead shrike nesting was concentrated in northwestern Pennsylvania; the species was probably regular but uncommon. Across the rest of the state, shrikes were a rare and irregular migrant. The last western Pennsylvania nesting record was in 1937 (Daniel Brauning, Pennsylvania Game Commission, pers. comm.).

Evidence of breeding was not observed in the state for over 50 years when a pair was observed carrying nesting material in Adams County (southcentral Pennsylvania) in 1990. Between 1992-1997, 1-3 pairs of nesting loggerhead shrikes were observed per year in southcentral Pennsylvania (D. Brauning, pers. comm.). It appeared that these birds were year-round residents. Hunter et al. (1995) suggested that milder winter weather conditions since 1960 may have facilitated the return of shrikes to southcentral Pennsylvania, and may allow the birds to stay in the area during the winter.

Yahner (1995) noted that loggerhead shrike sightings (probably not breeding birds) were recorded in only 4 counties in the Valley and Ridge physiographic province during the 1984-1988 atlas period.

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 4 birds on 3 BBS routes in Pennsylvania. Data are inadequate to estimate state trends.

Current population is 1-3 pairs nesting annually. Population is too small to identify a trend (D. Brauning, pers. comm.). Annual surveys are conducted in areas of known nesting. Core populations are likely all located, but some individual pairs may be missed (D. Brauning, pers. comm.).

CBC Trend 1959-1988: -0.5 Significance: NO N=21

State Legal Status

State Endangered. Yahner (1995) noted that loggerhead shrike was once listed as extirpated in Pennsylvania, but was upgraded to Endangered in 1992. Because of the species status as State Endangered, funds are expended on monitoring and protection of nest sites, and some habitat enhancement. USFWS section 6 funds have also been used for monitoring and habitat enhancement (D. Brauning, pers. comm.).

Current Research and Monitoring

The Pennsylvania Game Commission annually monitors known nest sites to determine nesting success and productivity (D. Brauning, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Several farms supporting nesting shrikes have been sold and sub-divided for housing in recent years (D. Brauning, pers. comm.).

Overutilization for commercial, recreation, scientific, or educational purposes: As a rare species, disturbance from recreational birding is a potential problem but has not been documented (D. Brauning, pers. comm.).

Disease or predation: Not documented in Pennsylvania.

Inadequacy of existing regulatory mechanisms: Inability to regulate land uses limits protection of nest sites (D. Brauning, pers. comm.).

Other natural or manmade factors affecting its continued existence: None noted.

Habitat Requirements and Condition

D. Brauning (pers. comm.) noted: "Shrike habitat in Pennsylvania includes pasture with hawthorns and/or cedar trees. Brushy edges and hedgerows are used. Shrikes have nested in trees and bushes in suburban yards, but their success in that setting is uncertain. Large suburban lots (big yards) and some agricultural area is used."

Subspecies of Loggerhead Shrike Occurring in the State

L.l. migrans (Miller 1931).

Loggerhead Shrike Conservation Activities in the State

In 1998, loggerhead shrike habitat improvement, specifically planting hawthorns and eastern red cedars, was implemented on the Eisenhower National Farm and 2 other sites (Siefken and Brauning 1998). These activities were directed by the Pennsylvania recovery and management plan for loggerhead shrike (Yahner 1995).

RHODE ISLAND

Historic and Current Range of the Loggerhead Shrike

Historically, loggerhead shrike was an uncommon but regular migrant in Rhode Island in fall, and an uncommon but regular winter resident. Since the 1970s sightings have become increasingly rare, the species being entirely absent in some years. There are no nesting records for the state (Chris Raithel, Rhode Island Division of Fish and Wildlife, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS: No records of loggerhead shrike

Population estimates and trends not applicable to Rhode Island.

State Legal Status

No State status.

Current Research and Monitoring

None

Threats to the Loggerhead Shrike in the State

None noted.

Habitat Requirements and Condition

No comments provided on habitat requirements.

Subspecies of Loggerhead Shrike Occurring in the State

The subspecies found during migration and winter in Rhode Island is *L.l. migrans* based on Miller (1931).

Loggerhead Shrike Conservation Activities in the State

None noted.

VERMONT

Historic and Current Range of the Loggerhead Shrike

A total of 23 nesting records of loggerhead shrike are known from Vermont. Most nesting occurred in the Lake Champlain Valley during the late 1800s and again in the 1950s. The most recent Vermont nesting record occurred in 1978. Few records of migrating loggerhead shrikes exist for Vermont, and no winter records are noted (Milburn 1981).

BBA (1976-1981): Breeding was confirmed twice, with 3 other possible breeding records (Bartgis 1992 *citing* Kibbe 1985).

Historic and Current Population Estimates and/or Trends

BBS: No records of loggerhead shrike

Based on records reported by Milburn (1981), loggerhead shrike was historically a rare breeding bird in Vermont. No shrikes were found during intensive searches in the 1980s and the species is no longer considered to breed in the state (Bartgis 1992 *citing* Kibbe 1985 and Fitchel 1988).

Bartgis (1992) noted that intensive searches were conducted during the 1980s, and no evidence of breeding was recorded. No more recent information is available.

State Legal Status

State Endangered (Bartgis 1992).

Current Research and Monitoring

No information provided.

Threats to the Loggerhead Shrike in the State

No information provided.

Habitat Requirements and Condition

No information provided.

Subspecies of Loggerhead Shrike Occurring in the State

L.l. migrans (Miller 1931).

Loggerhead Shrike Conservation Activities in the State

No information provided.

VIRGINIA

Historic and Current Range of the Loggerhead Shrike

Loggerhead shrike historically was widely distributed in Virginia, occurring in all 5 physiographic provinces, and in 54 of the state's 95 counties. By 1970, Clark (1970) described loggerhead shrike as a rare, local breeder in the Piedmont of northern Virginia. During the BBA (1984-1989), the species was found in 26 counties. Bartgis (1992) noted that approximately 100 records (confirmed, possible, or potential) were reported during the first 4 years of the BBA. The current range of the loggerhead shrike in Virginia is the Ridge and Valley and Piedmont Physiographic Provinces (Rick Reynolds, Virginia Department of Game and Inland Fisheries, pers. comm.).

Blumton (1989) noted that Virginia's loggerhead shrikes are year-round residents.

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -6.3 P=0.31 N=18
BBS Trend 1966-1979: -12.1 P=0.08 N=12 (note inadequate sample size)
BBS Trend 1980-1998: -12.6 P=0.22 N= 6 (note inadequate sample size)

Luukkonen (1987) analyzed BBS data for the period 1968-1983 and documented a 94% overall decline in the number of shrikes counted per BBS route. In 1996, the Virginia Department of Game and Inland Fisheries contracted Dr. Carola Haas to conduct a status survey of loggerhead shrike in Virginia. R. Reynolds (pers. comm.) provided the following summary of her report:

> "We surveyed 95 sites in 18 counties between June 5 and July 23, 1996, and found 19 loggerhead shrikes. Thirteen additional shrikes were reported by other observers in spring or summer of 1996. Of the combined total of 32 shrikes reported, 12 were in pairs, 9 individuals were fledglings, and age could not be determined for 10. One dead fledgling was found hit by a car. Only 1 pair and a fledgling were found at 48 breeding sites surveyed by Luukkonen and Blumton approximately ten years ago. The low number of birds surveyed indicates a continuing trend of population decline in Virginia."

R. Reynolds (pers. comm.) noted that the declines noted by both BBS and other surveys are reliable and accurate. Intensive monitoring of remaining birds would only confirm the declining trend. BBS can no longer provide trend data for this species in Virginia, due to the low number of routes on which it is detected.

In spite of the large-scale declines in the breeding population of loggerhead shrike in Virginia, the state remains the stronghold for the species in the Northeast (i.e. USFWS Region 5), where the shrike has been largely eliminated as a breeding species.

CBC Trend 1959-1988: -4.0 Significance: *** N=52

State Legal Status

State Threatened.

Current Research and Monitoring

A status survey was conducted in 1996. Luukkonen (1987) evaluated the status and breeding ecology of the species and Blumton (1989) evaluated factors affecting mortality. Blumton's work indicated that predation during winter may be a major cause of mortality; plans for additional research on this topic were abandoned because not enough shrikes could be located to warrant study (R. Reynolds, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: The consensus is that habitat loss and modification have contributed to loggerhead shrike decline in Virginia. Specifically, "clean farming" practices including the removal of fencerows and associated vegetation, generally followed by crop planting, has resulted in the loss of previously suitable habitat (R. Reynolds, pers. comm.).

Overutilization for commercial, recreation, scientific, or educational purposes: Not considered a factor in Virginia (R. Reynolds, pers. comm.).

Disease or predation: Research by Blumton (1989) indicated that predation by accipiters may be a major cause of mortality during winter months.

Inadequacy of existing regulatory mechanisms: Not considered a factor in Virginia (R. Reynolds, pers. comm.).

Other natural or manmade factors affecting its continued existence: R. Reynolds (pers. comm.) noted that habitat loss alone does not account for the magnitude of decline in loggerhead shrike populations in Virginia; seemingly suitable habitat is unoccupied. No specific additional causes were noted.

Habitat Requirements and Condition

Primary loggerhead shrike habitat in Virginia is closely grazed pastures with trees and shrubs, usually along fencerows. Most is on private land.

Blumton (1989) noted that shrikes moved into shrub-forest habitat during severe weather in winter.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), both *L.l. migrans* and *L.l. ludovicianus* occur in Virginia; he noted intergradation between the 2 subspecies in the state.

Loggerhead Shrike Conservation Activities in the State

Implementation of the "Virginia Bobwhite Quail Management Plan" (Capel et al. 1996) may benefit shrikes. Restoration of native grasslands and "old farm" habitats are components of the plan. However, R. Reynolds (pers. comm.) noted that until the cause for loggerhead shrike decline in Virginia can be

identified, conservation efforts for the species are unlikely to be effective.

WEST VIRGINIA

Historic and Current Range of the Loggerhead Shrike

Milburn (1981) reported that there were 23 records of loggerhead shrike nests in West Virginia between the period 1950-1979. These records were concentrated in eastern and southeastern West Virginia, in counties on or near the Virginia border. She found no historic records prior to 1950, but concluded that the species was likely present but not recorded.

By the late 1970s, loggerhead shrikes were considered very difficult to find in the state (Milburn 1981). Bartgis (1992) reported that 14 confirmed breeding pairs of loggerhead shrike were found in or near the Great Valley in 1991. He also reported that there have been occasional winter reports of shrikes in West Virginia from southwestern and eastern counties.

BBA (1984-1989): Loggerhead shrike was recorded in 20 of the state's 516 atlas blocks; 13 of the records were probable or confirmed (Buckelew and Hall 1994). BBA records confirmed that the distribution of loggerhead shrike in West Virginia is confined to areas bordering Virginia.

Historic and Current Population Estimates and/or Trends

Between 1966-1996, loggerhead shrike was represented by 15 birds on 6 BBS routes in West Virginia. Data are inadequate to estimate state trends.

Hall (1983) reported that by the early 1980s, the loggerhead shrike had almost completely disappeared from many of its "usual locations" in West Virginia.

Surveys during 1999 turned up few, if any, nesting records for loggerhead shrikes from known (previous) nesting sites in West Virginia. The species is considered to be declining in the state (Barbara Sargent, West Virginia Division of Natural Resources, pers. comm.).

State Legal Status

Vertebrate Species of Concern (Buckelew and Hall 1994).

Current Research and Monitoring

Surveys during 1999 turned up few, if any, nesting records for loggerhead shrikes from known (previous) nesting sites in West Virginia (B. Sargent, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Loss of breeding and wintering habitat as the result of changing agricultural practices have contributed to the decline of the loggerhead shrike in West Virginia (Buckelew and Hall 1994).

Most of the remaining shrike habitat in West Virginia is in the eastern panhandle, an area that is rapidly being developed because of its proximity to Washington, D.C. (B. Sargent, pers. comm.).

Overutilization for commercial, recreation, scientific, or educational purposes: Not noted.

Disease or predation: Predation on wintering shrikes may have contributed to population decline (Buckelew and Hall 1994).

Inadequacy of existing regulatory mechanisms: Not noted.

Other natural or manmade factors affecting its continued existence: Pesticides may have contributed to population decline (Buckelew and Hall 1994).

Habitat Requirements and Condition

The shrike occurs primarily on open pastureland with scattered trees for perching and nesting (Buckelew and Hall 1994).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), the subspecies of loggerhead shrikes in West Virginia is *L.l. migrans*, with some intergradation to *L.l. ludovicianus* on the border with Virginia.

Loggerhead Shrike Conservation Activities in the State

No conservation activities have been undertaken; according to Buckelew and Hall (1994) "there seems to be little that can be done to improve the status of this species" in West Virginia.

U.S. FISH AND WILDLIFE SERVICE REGION 6

Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, Wyoming

COLORADO

Historic and Current Range of the Loggerhead Shrike

Historic accounts (late 1800s, early 1900s) described the loggerhead shrike as common, chiefly on the plains which were then dominated by shortgrass prairie (Kingery 1998). The Colorado BBA (conducted 1987-1995) showed a statewide distribution for loggerhead shrikes, but with a distinct concentration in the plains of eastern Colorado. Of blocks with more than 10 breeding pairs, 85% were in the eastern plains (Kingery 1998). Statewide, confirmed breeding of shrikes was documented in 57% of atlas blocks. In winter, the species is considered rare to uncommon in western valleys north to Mesa County and southeastern plains north to southern El Paso County; accidental on northeastern plain (Andrews and Righter 1992). Ed Hollowed (BLM, pers. comm.) noted no winter use in BLM's White River Resource Area in northwest Colorado.

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: 3.7 P=0.11 N=42

BBS Trend 1966-1979: 0.4 P=0.94 N=10 (note inadequate sample size)
BBS Trend 1980-1998: 4.1 P=0.09 N=42

BBS sample sizes are currently considered adequate to estimate statewide trends.

Craig (1997) noted fluctuating numbers and breeding success rates of loggerhead shrikes in eastern Colorado; these findings are similar to those of Porter et al. (1975). Overall, her observations suggested that shrike populations, at least in her eastern Colorado study area, were stable.

E. Hollowed (pers. comm.) reported that populations in BLM's White River Resource Area in northwest Colorado have been stable since 1977.

CBC Trend 1959-1988: -2.6 Significance *** N=20

State Legal Status

No State status.

Current Research and Monitoring

S. Craig has an ongoing banding and demographic study.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: S. Craig (pers. comm.) noted that loss of habitat is not an immediate threat in her eastern Colorado study area. National Grasslands and grazing areas offer some stable refuge for breeding shrikes in this area.

E. Hollowed (pers. comm.) anticipates that habitat conditions for loggerhead shrike will not change appreciably in the next 15 years on BLM's White River Resource Area in northwest Colorado.

R. Lambeth (pers. comm.) noted:

> "The most obvious threat to nesting loggerhead shrikes is wildfire and inadequate appreciation of the wildlife values of the greasewood and, to a lesser extent, lower elevation sagebrush and scattered juniper habitats. Wildfire in the desert is seen by some land managers as good. It burns the shrubs bringing in solid stands of herb cover, usually annuals, that make good winter forage for livestock in most years."

Other natural or manmade factors affecting its continued existence: Porter et al. (1975) noted that breeding success in plains shrikes is highly variable depending on weather conditions. Pesticides are considered a potential problem (S. Craig, pers. comm.).

Other threats were not noted.

Habitat Requirements and Condition

Andrews and Righter (1992) described the habitat of the loggerhead shrike in Colorado: "Open riparian areas, agricultural areas, grasslands, and shrublands, especially semidesert shrublands, and sometimes open pinyon-juniper woodlands. Breeding birds are usually near isolated trees or large shrubs."

In the plains of eastern Colorado, Craig (1997) observed high densities of breeding loggerhead shrikes in an area with short cropped grass and short isolated trees. (She also noted the presence of barbed wire fences). Of all shrikes observed during the BBA, 47% occupied habitat classified as "rural," usually abandoned farmyards with untended trees, and shortgrass prairie accounted for 15% of all records (Kingery 1998). Much of the habitat in eastern Colorado is on private land (Kenneth Giesen, Colorado Division of Fish and Wildlife, pers. comm.).

In northwestern Colorado, loggerhead shrike nesting is generally associated with shrubs in salt desert habitats (E. Hallowed, pers. comm.). The tall desert shrub black greasewood is the most consistently used habitat in western Colorado (R. Lambeth, pers. comm.). Most habitat in western Colorado is on BLM and U.S. Forest Service lands (K. Giesen, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), *L.l. excubitorides* breeds in eastern Colorado and *L.l. nevadensis* in western Colorado, with intergradation between the 2 subspecies throughout the central portion of the state. S. Craig (pers. comm.) commented that based on morphometric characteristics of birds banded in eastern Colorado, *L.l. excubitorides* appeared to be the most common subspecies.

Loggerhead Shrike Conservation Activities in the State

BLM has adopted a full fire suppression policy on desert lands in some areas; this policy should preserve fire-sensitive shrubs and thus benefit loggerhead shrikes (R. Lambeth, pers. comm.).

KANSAS

Historic and Current Range of the Loggerhead Shrike

Historic and current breeding range of the loggerhead shrike in Kansas is statewide. The species is less abundant in winter, when it is found primarily in eastern and southern Kansas (Thompson and Ely 1992). It is unknown if the birds present in winter are year-round residents, or migrants from northern breeding ranges (Bill Busby, University of Kansas, pers. comm.). Kansas BBA data (1992-1997) confirm a statewide breeding distribution for loggerhead shrike. The species was found in 585 of a total 780 blocks surveyed (75%); breeding evidence was probable or confirmed for 70% of these records (B. Busby, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -2.3 P=0.01 N=39
BBS Trend 1966-1979: -4.3 P=0.07 N=34
BBS Trend 1980-1998: -3.9 P=0.00 N=38

While species accounts for the state typically characterize loggerhead shrike as a common breeding species in Kansas, B. Busby (pers. comm.) noted that population densities of loggerhead shrike in Kansas are low. The species is encountered frequently, relative to its abundance, due to its conspicuous behavior.

Range data are considered reliable; population trend data based on BBS are reliable but limited due to the relatively low number of routes on which the species is found. Additional BBS routes were planned for

1999 (B. Busby, pers. comm.).

CBC Trend 1959-1988: -1.1 Significance: NO N=39

State Legal Status

No State status.

Current Research and Monitoring

Michaels and Cully (1998) concluded that loggerhead shrikes at Fort Riley Military Reservation in Kansas were associated with scattered trees and shrubs at the landscape scale and with structurally heterogenous herbaceous vegetation at the fine-scale. In agricultural areas, short grass for foraging and adequate perch sites, in the form of powerlines, fences or woody vegetation, are considered essential for loggerhead shrikes. In natural grasslands, these considerations may not apply (Michaels and Cully 1998) .

B. Busby (pers. comm.) noted that research on habitat characteristics of loggerhead shrike in northeast Kansas is being conducted by Jack Cully at Kansas State University. Reports are not yet available.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Acreage of rangeland in Kansas is shrinking at a slow pace, but this may be offset by establishment of new grasslands through the CRP program (B. Busby, pers. comm.). Increasing efforts to remove hedgerows and to discourage woody vegetation in pastures, practices detrimental to shrike habitat, were noted (Jerry Horak, Kansas Wildlife and Parks, pers. comm.). However, habitat is not considered limiting, as apparently suitable habitat is unoccupied (B. Busby and J. Horak, pers. comms.).

No other threats were noted.

Habitat Requirements and Condition

Loggerhead shrike occur in open areas interspersed with trees and shrubs (Thompson and Ely 1992), often associated with rangeland in Kansas. The species occurs primarily on private land.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), *L.l. migrans* breeds in eastern Kansas and *L.l. excubitorides* in the western half of the state. Intergradation between the 2 subspecies occurs in central portions of the state.

Loggerhead Shrike Conservation Activities in the State

No information provided.

MONTANA

Historic and Current Range of the Loggerhead Shrike

The Montana Bird Distribution Committee (1996) indicated that the loggerhead shrike is a widely distributed breeding species in Montana, possibly breeding throughout the state, but confirmed breeding records are rare along the western boundary. Winter records are rare.

There is little information on historic range, but historic records suggest that the species was never abundant in the state (Eric Atkinson, Marmot's Edge Conservation, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: 0.0 P=0.99 N=24
BBS Trend 1966-1979: -13.5 P=0.26 N=10 (note inadequate sample size)
BBS Trend 1980-1998: 0.4 P=0.84 N=21

BBS sample sizes are currently considered adequate to estimate statewide trends, however, the applicability of BBS data to determine accurate population trends for Montana is questionable (E. Atkinson, pers. comm.). Vast roadless areas of Montana are not represented in the survey (Dwain Prellwitz, USFWS, pers. comm.).

BBS data suggest a relatively stable long-term population trend for loggerhead shrike statewide in Montana. Peterjohn and Sauer (1995) analyzed BBS trends by physiographic strata for the period 1966-1993; they noted that (continentwide) only 2 strata supported shrike populations that were not decreasing. One of these was the High Plains and Great Plains Roughlands strata, which extends along the western portion of the Great Plains from Montana and western South Dakota to eastern Colorado; the population in this strata was fairly stable.

State Legal Status

No State status (Ryan Rauscher, Montana Fish, Wildlife, and Parks, pers. comm.).

Current Research and Monitoring

Montana Fish, Wildlife, and Parks is currently conducting a study to monitor productivity, on a minimum of 30 nests, and characterize breeding habitat of loggerhead shrike (R. Rauscher, pers. comm.). One objective is to evaluate nesting success in farmyards versus shrub/grassland habitats.

E. Atkinson (pers. comm.) has also initiated a demographic study of loggerhead shrike.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Conversion of native grasslands, shrublands, open juniper woodlands, and small farms to large-scale agriculture adversely impacts loggerhead shrike habitat (E. Atkinson and R. Rauscher, pers. comms.).

Invasion by exotic annuals and pesticides have probably contributed to degradation of some loggerhead shrike habitat in Montana (E. Atkinson, pers. comm.).

Overutilization for commercial, recreation, scientific, or educational purposes: Not considered a threat to shrikes in Montana (E. Atkinson, D. Prellwitz, and R. Rauscher, pers. comms.).

Disease or predation: Predation on nests and young is common, but is not considered as threat to the species (E. Atkinson, D. Prellwitz, and R. Rauscher, pers. comms.).

Inadequacy of existing regulatory mechanisms: Not considered a threat to shrikes in Montana (E. Atkinson, D. Prellwitz, and R. Rauscher, pers. comms.).

Other natural or manmade factors affecting its continued existence: Pesticides may negatively affect shrikes in Montana (E. Atkinson, pers. comm.), but data are lacking.

Habitat Requirements and Condition

Loggerhead shrike habitat has been lost, and continues to be lost, as native prairies, open juniper woodlands, and small farms are converted to other land uses (E. Atkinson, pers. comm.). However, habitat may be created on CRP lands if trees/shrubs suitable for nesting are present (D. Prellwitz, pers. comm.).

Much habitat occurs on private land in shelterbelts and other plantings around old homesteads and farms. Other suitable habitat occurs in areas where there is a mixture of private and public lands (including lands managed by BLM, USFWS, and the Bureau of Indian Affairs). Vast areas of grasslands in Montana have scattered shrubs and fencelines which may provide suitable habitat (Stephanie Jones, USFWS, pers. comm.). Habitat also occurs along draws and coulees where suitable nest shrubs are found in conjunction with foraging habitat (E. Atkinson, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrikes in the eastern Great Plains portion of the state are *L.l. excubitorides*, and *L.l. gambeli* breeds in the shrub-steppe habitat western Montana. Intergrades between the 2 subspecies may occur through much of the central portion of the state.

Loggerhead Shrike Conservation Activities in the State

Montana PIF is developing population objectives and conservation strategies for loggerhead shrike (E. Atkinson, pers. comm.).

The current study being conducted by Montana Fish, Wildlife and Parks will result in management guidelines for loggerhead shrike in the state (R. Rauscher, pers. comm.).

NEBRASKA

Historic and Current Range of the Loggerhead Shrike

No information provided.

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -0.9 P=0.79 N=42

BBS Trend 1966-1979: -5.2 P=0.24 N=29
BBS Trend 1980-1998: 6.3 P=0.49 N=35

BBS sample sizes are considered adequate to estimate state trends.

State Legal Status

None (based on State World Wide Web site checked January 21, 2000).

Current Research and Monitoring

No information provided.

Threats to the Loggerhead Shrike in the State

No information provided.

Habitat Requirements and Condition

No information provided.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrike throughout western Nebraska are *L.l. excubitorides*, with intergradation with *L.l. migrans* in the eastern half of the state.

Loggerhead Shrike Conservation Activities in the State

No information provided.

NORTH DAKOTA

Historic and Current Range of the Loggerhead Shrike

Loggerhead shrike breeds statewide in North Dakota. The species is most abundant west of the Missouri River and least common in the Red River Valley and Northeastern Drift Plain (Stewart 1975; Todd Grant, USFWS, pers. comm.). The species does not winter in the state (Miller 1931).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -0.7 P=0.71 N=26
BBS Trend 1966-1979: -4.8 P=0.16 N=14
BBS Trend 1980-1998: 5.3 P=0.00 N=27

BBS sample sizes are considered adequate to estimate state population trends.

Igl and Johnson (1997) compared breeding bird populations in North Dakota using surveys conducted in 1967 and 1992-1993. Their study suggested an increase in the population of loggerhead shrikes between the 2 survey periods. However, sample sizes were small with 8, 16, and 15 pairs of shrikes detected in

1967, 1992, and 1993, respectively. During the same period (1967-1993), the population trend based on BBS data was an estimated 0.41% annual decline (not statistically significant).

Haas (1995a) monitored nests of loggerhead shrikes in shelterbelts in an approximately 8,000 ha study area in Sioux County, North Dakota for a 10-year period beginning in 1984. The number of breeding pairs fluctuated between 9 and 19 (averaging 12) but showed no consistent trend over time. Fledging success was high but return rates were low; low return rates were attributed to low site fidelity.

State Legal Status

No State status.

Current Research and Monitoring

None noted.

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: In the past 30 years, the acreage of hayland in North Dakota has declined 50%. The loss of this potentially suitable loggerhead shrike habitat may be offset, to some extent, by shelterbelt plantings and invasion of woody vegetation into remaining grassland habitats (T. Grant, pers. comm.).

Other natural or manmade factors affecting its continued existence: Widespread pesticide use in years of grasshopper outbreaks is a potential concern (T. Grant, pers. comm.).

No other threats were noted.

Habitat Requirements and Condition

The loggerhead shrike is considered an open-country edge species in North Dakota, inhabiting thickets of small trees/shrubs in or adjacent to crop fields or prairie. Scattered natural thickets and woody vegetation associated with altered landscapes (shelterbelts, cemeteries, farmsteads) are used (Stewart 1975).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrike throughout western North Dakota are *L.l. excubitorides*, with intergradation with *L.l. migrans* in the eastern half of the state.

Loggerhead Shrike Conservation Activities in the State

No conservation activities specific to shrikes were noted. North Dakota has approximately 3 millions acres of cropland enrolled in CRP, which provides some shrike habitat. State and Federal programs encourage tree plantings for wildlife habitat and erosion control (T. Grant, pers. comm.).

SOUTH DAKOTA

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike is considered a fairly common breeding bird in South Dakota; less common in the eastern fourth of the state and rare in the Black Hills. The species does not regularly winter in the state, although there are undocumented winter records (South Dakota Ornithologists' Union 1991). The BBA (conducted from 1988-1993) confirmed widespread distribution for loggerhead shrike in South Dakota; the species was documented in 49% of 124 random blocks surveyed and was found in 16 of 17 "ecological regions" (Peterson 1995). Probable or confirmed breeding accounted for 36% of all reports.

Historical information is limited, but the range of the species has probably not changed (Doug Backlund, South Dakota Department of Game, Fish and Parks, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -0.5 P=0.70 N=36
BBS Trend 1966-1979: 4.6 P=0.18 N=23
BBS Trend 1980-1998: -1.5 P=0.50 N=29

BBS data are considered adequate to estimate state population trends. D. Backlund (pers. comm.) noted that additional surveys are not needed.

State Legal Status

No State status.

Current Research and Monitoring

None (D. Backlund, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Loss of grassland habitat has probably affected loggerhead shrike in the state, but abundant suitable habitat is still available (D. Backlund, pers. comm.).

Other natural or manmade factors affecting its continued existence: Pesticides likely affect loggerhead shrike, but impacts apparently aren't severe as the species is doing well in the state (D. Backlund, pers. comm.).

No other threats were noted.

Habitat Requirements and Condition

Loggerhead shrike occurs on grasslands with scattered trees or shelterbelts; most occur on private land (D. Backlund, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), breeding loggerhead shrike throughout western South Dakota are *L.l. excubitorides*, with potential intergradation with *L.l. migrans* in the eastern half of the state.

Loggerhead Shrike Conservation Activities in the State

None noted.

UTAH

Historic and Current Range of the Loggerhead Shrike

The loggerhead shrike is a common permanent resident statewide in lower valleys and foothills where there is desert shrub habitat and pinyon-juniper forest. Less common statewide in winter, but more abundant in the south than the north (Behle et al. 1985). Historic distribution was also statewide (Frank Howe, Utah Division of Wildlife Resources, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: 4.7 P=0.28 N=29
BBS Trend 1966-1979: trend not available
BBS Trend 1980-1998: 13.0 P=0.10 N=30

BBS data are considered reliable (F. Howe, pers. comm.).

Population is considered stable (F. Howe, pers. comm.).

CBC Trend 1959-1988: -1.4 Significance ** N=16

State Legal Status

No State status. Species was considered for listing as "State Sensitive" in 1993 (based on evidence of rangewide decline), but was not listed since the population appeared stable and the species was considered a common breeder in the state (F. Howe, pers. comm.).

Current Research and Monitoring

There is no activity specifically focusing on shrikes. The Utah Division of Wildlife Resources and the U.S. Department of Defense (Dugway Proving Grounds) initiated a study in 1998 which will focus on the effects of military activities and wildfires on pinyon-juniper associated landbirds, including loggerhead shrike (F. Howe, pers. comm.).

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: Loggerhead shrike habitat, including shrub-steppe and pinyon-juniper, is lost to chaining and "rehabilitation" projects, but this loss does not affect a large portion of available habitat. Also, these practices have been reduced in recent years. The most recent and potentially more significant threat is from catastrophic

wildfire. Recent invasions of non-native grasses (primarily cheatgrass) have changed fire frequency and intensity in shrub-steppe and pinyon-juniper habitats (F. Howe, pers. comm.).

Overutilization for commercial, recreation, scientific, or educational purposes: Not considered a threat in Utah (F. Howe, pers. comm.).

Disease or predation: Not considered a threat in Utah (F. Howe, pers. comm.).

Inadequacy of existing regulatory mechanisms: Not considered a threat in Utah (F. Howe, pers. comm.).

Other natural or manmade factors affecting its continued existence: Land management agencies are attempting to reduce the risk of catastrophic fires in shrubland and woodland habitat, but given the widespread invasion of cheatgrass it is not clear if these efforts will be effective. "In addition, the practice of planting non-native plants in burn restoration areas (often with the exclusion of native shrubs) does present a threat to shrike habitat (F. Howe, pers. comm.)."

Habitat Requirements and Condition

Shrike habitat in Utah occurs primarily on public lands in shrub-steppe or pinyon-juniper habitats.

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), there is potential for 3 breeding subspecies of loggerhead shrikes in Utah. *L.l. nevadensis* breeds statewide with potential intergradation with *L.l. gambeli* in extreme northern Utah and with *L.l. excubitorides* in the northeastern corner. Behle (1985) reviewed various treatments of loggerhead shrike systematics in Utah; based on his examination of 111 specimens from the University of Utah collection he concluded that *L.l. nevadensis* is a "good" race and is the breeding form throughout the state. *L.l. nevadensis* also occurs, along with *L.l. gambeli*, in winter.

Loggerhead Shrike Conservation Activities in the State

The Utah PIF Conservation Plan will focus on pinyon-juniper habitats; conservation and management of these habitats would benefit loggerhead shrike.

WYOMING

Historic and Current Range of the Loggerhead Shrike

The historic breeding distribution included the entire state below 7,000 feet elevation, where loggerhead shrikes were considered locally common (Mary Jennings, USFWS, pers. comm. *citing* McCreary 1937). The breeding distribution remains relatively unchanged. The state's breeding population migrates south for winter, although occasional winter records occur (Katy Duffy, Grand Teton National Park, pers. comm.).

Historic and Current Population Estimates and/or Trends

BBS Trend 1966-1998: -1.4 P=0.53 N=60
BBS Trend 1966-1979: -1.8 P=0.55 N=16
BBS Trend 1980-1998: 4.1 P=0.01 N=58

The species is, qualitatively, considered a common summer resident, although no population estimate is available (M. Jennings, pers. comm.). BBS data, which suggest a relatively stable population in the state, are considered adequate to estimate statewide trends. BBS routes are distributed throughout the state, although coverage is not adequate in some areas (M. Jennings, pers. comm.).

State Legal Status

No State status.

Current Research and Monitoring

None

Threats to the Loggerhead Shrike in the State

The present or threatened destruction, modification, or curtailment of its habitat or range: The oil and gas industry is undergoing rapid expansion in field exploration and development in the state. This has not led to intensive habitat conversion, but could potentially affect loggerhead shrikes in the future (M. Jennings, pers. comm.).

Other factors were not considered a threat to loggerhead shrikes in the state (M. Jennings, pers. comm.).

Habitat Requirements and Condition

Loggerhead shrike breeds in any non-forested habitat in the state if suitable nest substrate is present. In north and east Wyoming, this includes shortgrass prairie, and in the western part of the state the Great Basin shrub-steppe. The main management impact is grazing, but the species is found even in heavily grazed areas. Shrub removal through chaining, disking, burning and herbicide application is a widespread range improvement technique with unknown impacts on loggerhead shrike. Approximately 50% of available habitat is Federally owned, primarily by BLM (M. Jennings, pers. comm.).

Subspecies of Loggerhead Shrike Occurring in the State

Based on Miller (1931), *L.l. excubitorides* breeds in eastern Wyoming and *L.l. gambeli* breeds in the west, with potential for intergradation between the subspecies throughout most of the state. These subspecies may also intergrade with *L.l. nevadensis* in southern Wyoming.

Loggerhead Shrike Conservation Activities in the State

No activities specific to loggerhead shrike were noted. Wyoming PIF is currently developing a statewide conservation plan for all nongame birds, which will include management recommendations for each species. Loggerhead shrike is currently listed as a Level II species by Wyoming PIF; this designation indicates a need for population monitoring (M. Jennings, pers. comm.).

CANADA

The loggerhead shrike is listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as a threatened species in western Canada and an endangered species in eastern Canada. Eastern Population: Quebec, Ontario, eastern Manitoba

Western Population: Alberta, Saskatchewan, western Manitoba

Historic and Current Range of the Loggerhead Shrike

(Adapted from Cadman 1991). The breeding range of the loggerhead shrike has changed considerably in Canada since the late 1800s. Prior to opening of forests for agriculture in eastern Canada, the loggerhead shrike was restricted to prairie-like and parkland habitat in northwestern and southwestern Ontario. With the clearing of forests for cultivation, the species range extended throughout southern Ontario, and into southern Quebec and the Maritimes. A smaller range expansion took place in the Prairie Provinces, where cultivation opened areas of aspen parkland to the north of the prairies. Known breeding range continued to expand until the middle of the twentieth century. Its range in eastern Canada has been shrinking since that time; there has been a retraction from the northern edge of the breeding range in Ontario and Quebec, and the species no longer breeds in the Maritimes. The breeding range in eastern Canada is now restricted to southwestern Quebec, southern Ontario, and southeastern Manitoba. There was also a retraction from the northern edge of the range in the Prairie Provinces. Campbell et al. (1997) reported that there were no nesting records for the species in British Columbia, although there were rare sightings in portions of the province in all seasons. Cadman (1985) provided a detailed discussion of changes in loggerhead shrike breeding range in Canada. Robert and Laporte (1991) provided a detailed history of the loggerhead shrike in Quebec.

The Ontario BBA (Cadman 1987), conducted from 1981-1985, resulted in a provincial population estimate of 50 to 100 breeding pairs annually, with all but a few concentrated in southern Ontario. Loggerhead shrike was reported in 21 (15%) of 137 blocks; 18 of those records were probable or confirmed breeding. The BBA of southern Quebec, conducted from 1984-1989, reported loggerhead shrike in only 7 atlas squares, and never more than 1 pair was reported in a square (Robert et al. 1996).

Loggerhead shrike does not winter in Canada (Miller 1931). Limited band recoveries suggest that individuals that breed in western Canada winter in eastern Texas and adjacent regions (Johns et al. 1994). It is assumed that eastern Canada's breeding population winters in the southeastern U.S. (Johns et al. 1994).

Historic and Current Population Estimates and/or Trends

Alberta:
BBS Trend 1966-1998: -3.4 P=0.45 N=17
BBS Trend 1966-1979:-10.8 P=0.04 N= 7 (note inadequate sample size)
BBS Trend 1980-1998: 10.4 P=0.20 N=14

Saskatchewan:
BBS Trend 1966-1998: -9.8 P=0.01 N=30
BBS Trend 1966-1979:-15.6 P=0.00 N=19
BBS Trend 1980-1998: -0.6 P=0.77 N=22

BBS sample sizes are adequate to estimate provincewide trends only in Alberta and Saskatchewan.

Johns et al. (1994) reported the following population estimates by province (see Johns et al. 1994 for additional detail on the sources of data for estimates):

Quebec - only 2 breeding pairs found in 1991 in spite of extensive search. There were no sightings in Quebec in 1996 or 1997 (M. Robert, pers. comm.).

Ontario - exhaustive search in 1992 resulted in estimate of 100 individuals.
Manitoba - approximately 500 breeding pairs. However, the eastern Manitoba population was estimated at less than 50 pairs in 1998 (Ken DeSmet, Manitoba Dept. of Natural Resources, pers. comm.).
Saskatchewan - probably several thousand breeding pairs. BBS data suggest that the population in Saskatchewan declined from 1966-1979, but that is has since stabilized at the lower level.
Alberta - population estimated at 400 pairs, but the population is thinly distributed over large areas making the status difficult to evaluate. Based on surveys conducted in 1993, Bjorge and Prescott (1996) estimated the population in the core breeding areas of southeastern Alberta at approximately 2,500 pairs.

Johns et al. (1994) noted: "The remaining strongholds of the Loggerhead Shrike are in portions of southwestern Manitoba, southern Saskatchewan, and southeastern Alberta."

Cadman (1985) provided a detailed discussion of population size and trends by province.

A considerable amount of monitoring has been conducted for loggerhead shrike in Canada; reliability of population estimates is generally considered good.

Legal Status

The loggerhead shrike is listed by COSEWIC as a threatened species in western Canada and an endangered species in eastern Canada. In 1986, the species was designated as threatened across Canada. The eastern population was reevaluated in 1991 and uplisted to endangered (Cadman 1985), reflecting the more precarious status of the species in eastern Canada. The eastern population includes birds breeding in Quebec, Ontario, and eastern Manitoba. The western population includes birds breeding in Alberta, Saskatchewan, western Manitoba.

The loggerhead shrike is also on provincial endangered species lists in Ontario, Manitoba, and Saskatchewan (B. Johns, pers. comm.). These listings protect the species, as well as nests and eggs; in Ontario habitat is also protected. Cuddy (1995) provided a discussion of the legal definition of habitat in Ontario. The species will soon be legally classified as threatened in Quebec (M. Robert, pers. comm. 1998).

Current Research and Monitoring

The "National Recovery Plan for the Loggerhead Shrike" (Johns et al. 1994) details research and monitoring needs, as well as some discussion of ongoing work. Periodic monitoring is conducted in all provinces where shrikes occur, or recently occurred.

Telfer et al. (1989) evaluated status and distribution in the Prairie provinces of western Canada based on roadside counts. Telfer (1992) evaluated habitat change as a factor in the decline of the loggerhead shrike in western Canada (Alberta and Saskatchewan). He also looked at habitat condition in south Texas, the presumed winter range of western Canada's shrikes. He found that regions of Alberta and Saskatchewan which experienced the most severe declines in shrike numbers had a 39% decline in unimproved pasture between 1946-1986. This compared to a 12% decline in regions that retained substantial numbers of nesting shrikes (southwest and northwest Saskatchewan and southern Alberta). On the presumed winter range in Texas, pasture area had also declined. In Alberta and Saskatchewan native prairie is prime loggerhead shrike habitat and its preservation is considered important for shrike conservation efforts. Pasture, while not as good as native prairie habitat, is better than crop fields or fallow land. Telfer (1992) recommended the planting of at least 1 patch of suitable nesting shrub/tree species per 65 ha, if suitable clumps are not available.

Nineteen nestling shrikes were collected in 1992 by the Avian Science and Conservation Centre of McGill University in Quebec and a captive breeding colony was established. "The colony was established to learn more about shrike biology, to develop propagation techniques, to be used as a management tool to help determine why shrike populations are declining in the wild, and to assess the feasibility of captive propagation and release (Johns et al. 1994)."

Prescott and Collister (1993) evaluated characteristics of occupied and unoccupied loggerhead shrike territories in southeastern Alberta. Bjorge and Prescott (1996) estimated population size and evaluated habitat associations of the loggerhead shrike in southeastern Alberta.

Collister and Wicklum (1996) evaluated intraspecific variation in loggerhead shrikes in southeastern Alberta. They found no significant sexual dimorphism in loggerhead shrikes on Canadian Prairies. They also found that variation in wing chord:tail length ratios within the population they studied precluded the use of this measure to assign a specimen to a subspecies; this was a measure used by Miller (1931) to differentiate among subspecies.

Shrike surveys are conducted every 5 years in western Canada. The third of the 5-year surveys was scheduled to be conducted in 1998 (B. Johns, pers. comm. 1998).

Vallianatos (1999) evaluated mitochondrial DNA variation among over 200 loggerhead shrike samples from different localities across central and eastern North America. A significant amount of the genetic variation observed among her samples was differentiated among 4 geographic regions. Her work supported the existence of the intergrade zone between *L.l. migrans* and *L.l. excubitorides*, as described by Miller (1931). Additional research on the genetic diversity of Canadian shrikes and characterization of the hybrid zone between *L.l. migrans* and *L.l. excubitorides* is planned (Stephen Lougheed, Queen's University, pers. comm.).

Threats to the Loggerhead Shrike

In Canada's recovery plan, Johns et al. (1994) noted: "The principal drawback to recovery efforts for the Loggerhead Shrike is that the cause of its population decline is unknown." Suspected causes are outlined below.

The present or threatened destruction, modification, or curtailment of its habitat or range: Declines in Canada's breeding populations of loggerhead shrike parallel the loss of native habitat both on the breeding and wintering range (Johns et al. 1994). Conversion of pasture to cropland and removal of shelterbelts and hedges have reduced nesting opportunities for shrikes. The area of pasture in Ontario decreased 65% between 1921-1986; in Quebec, area of pasture decreased 85% between 1941-1990 (Cadman 1991). Remaining populations in eastern Canada are primarily associated with 3 core areas in eastern Ontario, each associated with a limestone plain (Chabot et al. 1995a). Gravel extraction operations, in at least 1of these core areas, are a threat to the shrike population (Cadman 1991). Habitat is also being lost to industrial and housing development (Cadman 1991).

Cadman (1985) noted that shrike numbers decreased more rapidly than the rate of decrease in habitat in eastern Canada; apparently suitable habitat is unoccupied. While it is generally accepted that habitat loss led to the slow reduction in shrike numbers through the mid 1900s, continued widespread decline probably involves other factors.

While it is frequently noted that much apparently suitable habitat for loggerhead shrikes remains unoccupied, Prescott and Collister (1993) cautioned that the suitability of unoccupied sites has not been

quantitatively assessed in most situations. They quantitatively evaluated characteristics of occupied and unoccupied loggerhead shrike territories in southeastern Alberta and concluded that the population they studied was limited by the availability of high-quality breeding habitat. Telfer (1992) also concluded that habitat loss was a factor in the decline of loggerhead shrike in Alberta and Saskatchewan.

Overutilization for commercial, recreation, scientific, or educational purposes: Not noted.

Disease or predation: Not noted.

Inadequacy of existing regulatory mechanisms: The most effective regulatory mechanisms available in Canada are already in place. The loggerhead shrike is listed by COSEWIC as a threatened species in western Canada and an endangered species in eastern Canada. The species is also on provincial endangered species lists in Ontario, Manitoba, and Saskatchewan. The species will soon be legally classified as threatened in Quebec.

Other natural or manmade factors affecting its continued existence: Pesticides or other contaminants are considered a potential threat. Shrike declines in the 1950s and 1960s corresponded with widespread use of DDT. Declines of prairie shrikes corresponded with application of dieldrin to control grasshopper outbreaks (Johns et al. 1994). Cadman (1985) provided anecdotal evidence that suggested roadside spraying of herbicides may have resulted in local reductions in shrike numbers in Ontario.

Collisions with automobiles are also considered a potential threat, particularly when shrike numbers are low (Johns et al. 1994).

Competition from resident shrikes on winter range may be a limiting factor (Johns et al. 1994), although no information is available to evaluate this threat.

Habitat Requirements and Condition

Remaining populations in eastern Canada are primarily associated with 3 core areas in eastern Ontario, each associated with a limestone plain (Chabot et al. 1995a). Most breeding shrikes are found in actively grazed pastures. Cuddy (1995) noted that all known nesting in Ontario was on private land.

In the Prairie Provinces of western Canada, loggerhead shrike is found chiefly in the arid shortgrass or desert savanna and plains areas (Cadman 1985).

Most shrike habitat in Canada is associated with agricultural land and little is under government ownership (Cadman 1985).

Subspecies of Loggerhead Shrike in Canada

Following Miller (1931), it is generally considered that *L.l. migrans* breeds in eastern Canada, *L.l. excubitorides* breeds in western Canada, and the 2 subspecies intergrade in eastern Manitoba (Johns et al. 1994). However, Collister and Wicklum (1996) noted that loggerhead shrikes in Canada are listed based on an eastern and western population, rather than based on subspecies, due to the difficulty in ascertaining subspecies.

Loggerhead Shrike Conservation Activities in Canada

A "National Recovery Plan for the Loggerhead Shrike" was prepared in 1994 (Johns et al. 1994). The recovery plan outlines specific recovery goals and objectives.

The Canadian Wildlife Service (CWS 1999) reported the following progress on recovery objectives for the eastern population: 1) continued studies of population status, reproductive success, and fledgling survival; 2) maintained 2 captive populations of loggerhead shrikes (a total of 44 founder birds), analyzed genetic variability in captive populations, and developed protocol for release of captive-reared birds; 3) implemented efforts to reduce traffic speed on rural roads in shrike nesting areas and monitored effectiveness of those efforts; 4) implemented outreach efforts for landowners that own shrike habitat in Ontario; 5) studied toxicological studies of road dust suppressant "Dombind"; 6) evaluated 60 recent loggerhead shrike nest sites for Ontario's Conservation Land Tax Incentive Program; and 7) limited habitat management was implemented.

The Canadian Wildlife Service (CWS 1999) also reported the following progress on recovery objectives for the western population: 1) conducted a prairiewide population survey and other monitoring efforts; 2) conducted stable-hydrogen isotope analysis of feathers to determine wintering locations of birds that breed in western Canada; 3) initiated a nest site database for use in GIS applications; and 4) habitat management accomplished through "Operation Grassland Community."